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VOLUME 40, No. 22

AMERICAN DYESTUFF REPORTER

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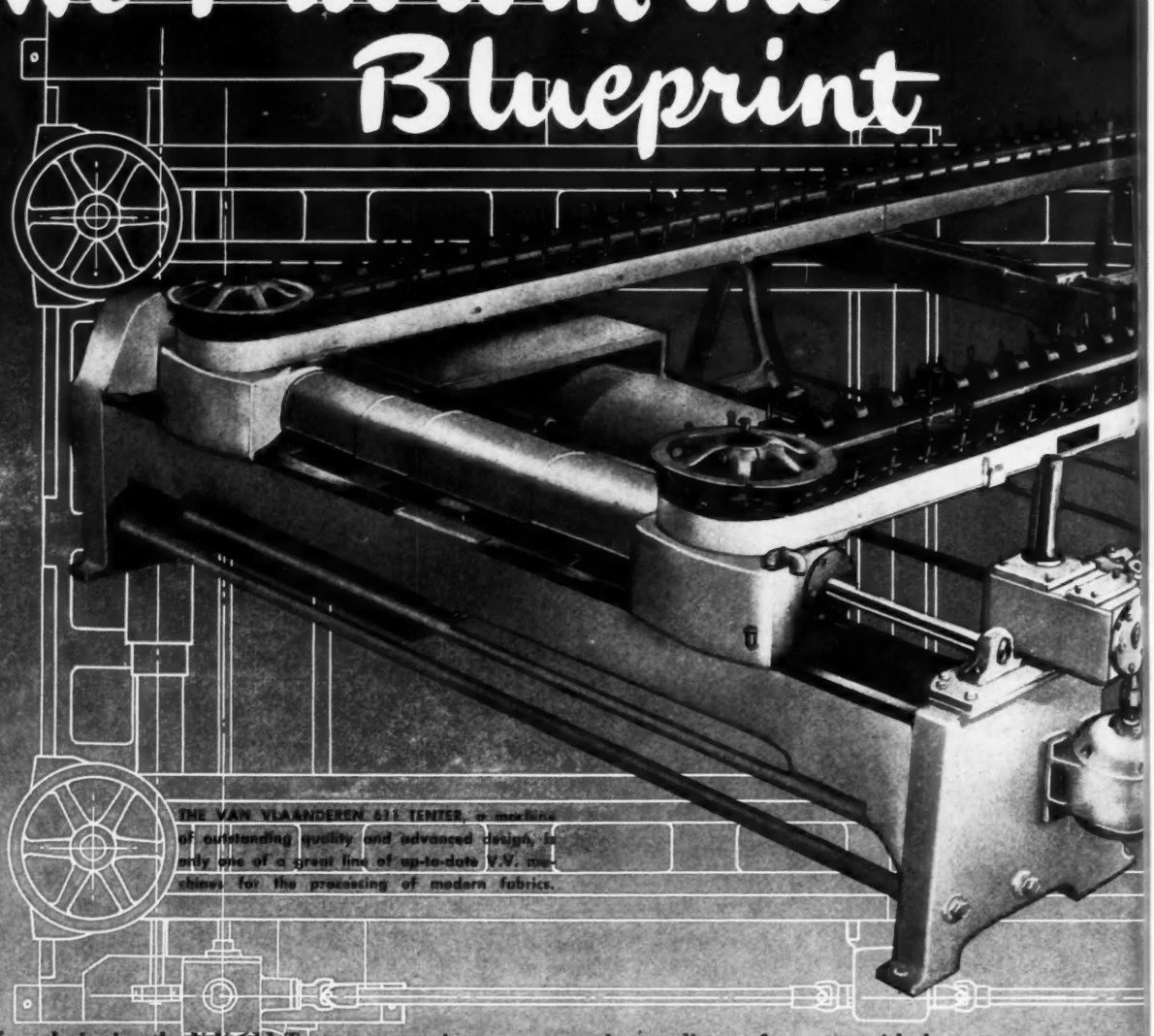

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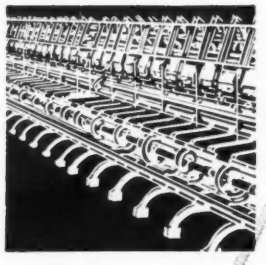

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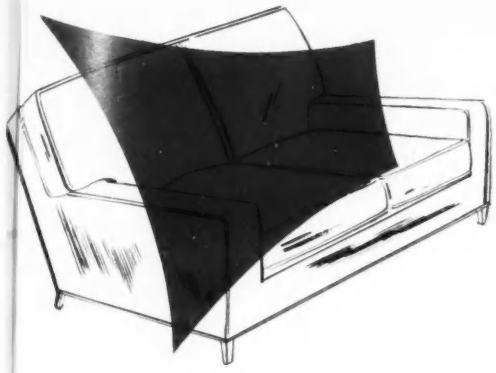

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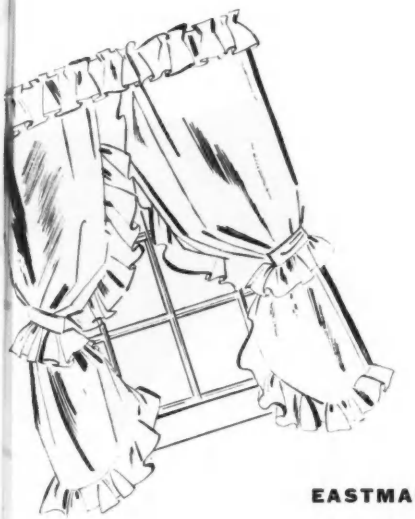

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AMERICAN
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VOLUME 40 OCTOBER 29, 1951 NUMBER 22

A PRECISION INSTRUMENT FOR DETERGENCY STUDIES*

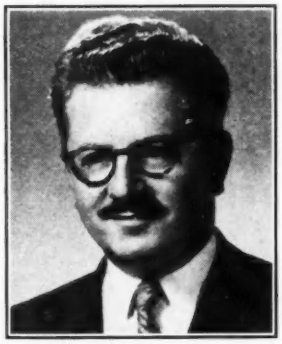
H J WOLLNER and G S FREEMAN
American Conditioning House, Inc
Boston, Massachusetts

INTRODUCTION

THE most persuasive method for evaluating a detergent or washing formula designed for laundry use is to try it out in a laundry. Considerations of cost, time consumption, and lack of chemical and statistical control have made this approach unwieldy, expensive and inadequate. It has long been recognized that the development of satisfactory laboratory techniques for the study and evaluation of detergents for laundry usage would be most desirable. Two factors, among others, have militated against the successful achievement of this goal: a source of soil cloth sufficiently and uniformly impregnated with selected soil components has not been available and an instrument has not been heretofore developed of sufficient flexibility in its operating characteristics to reproduce under statistically and mechanically controlled conditions the range in dynamics inherent in laundry washer operation.

The foregoing statement is made in full acceptance of the fact that several useful detergent-evaluating devices are already on the market. Similarly, a number of soil-impregnated cloths are available, made by interested laboratories, which essay to meet the need for indicator cloth. These, however, frequently lack an essential characteristic to good testing, i e, uniformity in construction and composition within precisely defined narrow limits of variation *(1, 2)*. No mention is made here of the composition of the soil involved, this obviously being a matter left to the discretion of the detergent chemist, who should generally be interested in testing a detergent with respect to specific types of soils in accordance with the projected application of that detergent in use.

Detergency studies of such diverse laundering problems as mechanic uniforms and baby's diapers have revealed the importance of this point.



H J Wollner

G S Freeman

The design of a new precision detergency measuring instrument is discussed. Design objectives are enumerated and the method of achieving them outlined. The concept of supplying mechanical action in the form of a sinusoidal oscillation and its utilization are discussed along with the prospects of determining the mathematical relationship between energy input and soil removal. Data are given indicating the high test precisions that the Deter-Meter detergency tester is capable of producing.

DESIGN OBJECTIVES

The general objectives include the development of a laboratory type unit for evaluating detergents used in laundering or dry cleaning in the determination of such factors of soil removal and redeposition as time, temperature, rate and dynamics of mechanical washing action.

As a preliminary step, those laboratory devices which were already available were reviewed. Information obtained through this preliminary study made it possible to enumerate the criteria on the basis of which the projected instrument must be designed. These are as follows:

(1) mechanical action producing a dynamic system considered fundamental in a commercial washer;
(2) high order of test precision and reproducibility;
(3) precisely controlled dynamic energy input operable over a wide continuous range;
(4) energy input to the detergent-cloth system of such character as to lend itself to mathematical analysis;
(5) applicability to both reflectance and turbidity methods of soil removal measurement, with the latter adaptable to continuous measurement;
(6) suppression of error arising from soil redeposition in soil removal tests using the reflectance method;
(7) precise temperature control, oper-

* The device herein described was designed and constructed for the United States Army Quartermaster Corps under War Department Contract W44-109-qm-2244.

able over a wide range; and

(8) ease of operation and reduction of operator contributed error.

In an effort to introduce the foregoing enumerated criteria, several basically different devices were designed, constructed and tested. After an evaluation of the performance characteristics of these devices, new concepts were introduced which evolved into the instrument herein described and referred to as the Deter-Meter detergency tester *(3, 4)*.

WASHER DYNAMICS

It is well known that the removal of soil from cloth by agitation of the soiled cloth while immersed in a fluid system containing detergents is a function of the dynamics of that system *(5, 6, 7, 8)*. The mechanical action or dynamics of a commercial washer comprises many factors *(9)*, perhaps the most important of which are impact and friction. Of these two, impact appears to be more important. It is believed that when the fabric is dropped from the lifting vanes of a washer or is subject to contact with another piece of the cloth similarly dropped, the impact generated through the fabric mass introduces high liquid velocities within that fabric. It is this high hydraulic velocity that flushes the soil released by the detergent from the fabric mass. An excellent example of this may be found in the ancient and highly efficient method of washing by pounding the clothes against a rock.

In designing the Deter-Meter detergency tester, it was considered desirable to use impact as the method of supplying the mechanical energy to the detergent-cloth system and to minimize the effect of friction. The reasons for minimizing this effect were: (1) friction reduces close testing control; (2) the effects of friction are probably less dependent upon detergent action than is impact; and (3) friction is almost purely a surface phenomena whereas impact promotes washing throughout the fabric mass.

PRINCIPLE OF OPERATION

The washing mechanism of the Deter-Meter detergency tester consists of a nonrotating washing cylinder mounted with its axis vertical and designed to oscillate along this axis. Within the cylinder are two impact surfaces equipped with suitable apertures to permit the passage of fluid. These surfaces are mutually parallel and fixed at right angles to the cylinder axis. In operation, a single 100 mm disc of test fabric is placed between them. The oscillating movement of the cylinder impels both the cloth and its supernatant and subnatant liquid vertically upward to the end of the stroke, at which point the reversal of movement of the cylinder brings the upper impact surface into uniform face contact with the rising cloth and its attendant mass of liquor; similarly, on the downward stroke the opposite surface of the soiled cloth is subjected to an impact. The oscillations of the cylinder may be adjusted to occur either totally

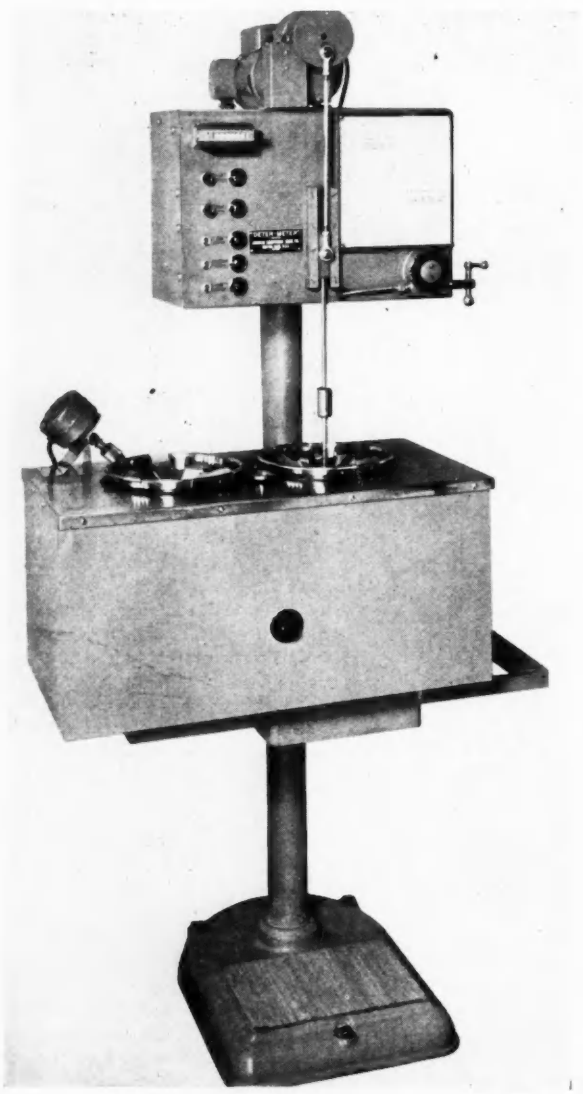


Figure 1

General View of Deter-Meter Detergency Tester

Shown are the Graham drive at top; instrument panel with counter and micrometer unit; constant temperature bath with dual operating positions, stirrer, and thermostat adjusting knob.

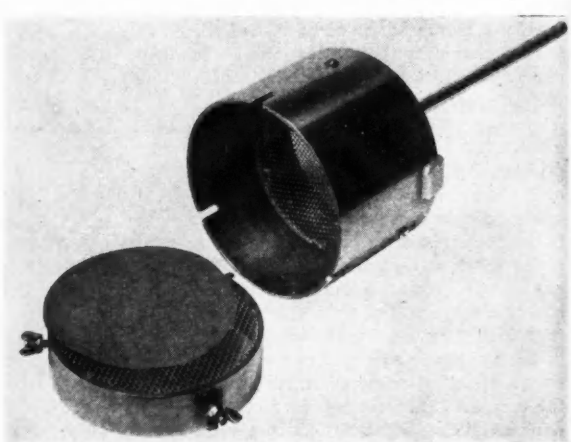


Figure 2

Washing Cylinder Showing Relative Placement of Impact-Surfaces and Soiled Test Piece

Provision for varying impact-surface spacing is shown at points where the upper retaining ring is fastened to the cylinder.

beneath the surface of the detergent solution or, alternately, partially below and partially above the liquid level. By varying the impact surface spacing, the frequency of oscillation, and the amplitude, wide and continuous ranges of force of impact are possible. The motion is sinusoidal in nature and may be described mathematically by the usual sine wave equations:

$Y = A \sin \omega t$

$v = \omega A \sin \omega t$

$a = \omega^2 A \cos \omega t$

where:

Y = displacement from the x (time) axis
A = maximum amplitude
$\omega = 2\pi f$
f = frequency
t = time
v = velocity
a = acceleration

By means of these equations, the velocity and acceleration imparted to the fabric by the washing cylinder may be studied with regard to their probable levels for any instant during oscillation.

DESCRIPTION

In operation, the washing cylinder is placed within a beaker of detergent solution and the cylinder shaft is connected to the driving mechanism. The driving mechanism consists of the motor unit, crank arm disc, connecting rod, and an actuating rod, which is held in a sliding bearing. The connecting rod may be fastened to the crank-arm disc at one of three points, these providing variations in the amplitude of oscillation of the cylinder. The connecting and actuating rods in conjunction with the sliding bearing serve to translate the rotary motion of the motor unit to a reciprocating motion at the washing cylinder. The motor unit selected was a Graham Drive, a variable speed unit that provides precise, straight-line, stepless frequency control over the desired range. Measurement of the frequency was accomplished by the use of a re-settable electric counter which counts each oscillation. The space between the impact surfaces within the washing cylinder may be varied by the relative positioning of the upper surface (three positions being provided). Thus the three variables of sinusoidal motion, namely, amplitude, frequency and length of intercept, are subjected to control.

An insulated constant temperature water bath equipped with two electric heaters was utilized to control the temperature of the beakers containing the detergent solution. One of the heaters is employed to maintain the desired temperature of the bath. The two together are used to shorten the time necessary to raise the bath to the temperature selected.

In order to insure maximum sensitivity of the thermostat, which is a function of the electrical load it has to carry, a relay was employed to carry the heavy current required by the heaters. Thus, instead of carrying the 17 amp heater current, the thermoswitch carries the relay coil current of about 0.085 amps.

Maintaining the high sensitivity of the thermoswitch (±0.1°F) would have little effect upon the final temperature control unless the temperature throughout the bath was made relatively uniform. Past experience had indicated that reliance upon convection currents to accomplish this task is generally unsatisfactory, so an electric stirrer was incorporated. This served to increase the rate of heat transfer between the beakers and the water in the bath as well as to improve the temperature control.

Facilities for preheating detergent solution were made available by constructing the constant temperature bath top with two openings such that one beaker is preheating while the other is employed in testing.

Operation of the instrument after its construction proved to be simple and straightforward. Test precisions achieved were gratifyingly high. It has been in continuous use at our laboratory since the day of its construction and has not once failed to meet the needs at hand.

TEST RESULTS

Data derived from Deter-Meter detergency tester experiments conducted at this laboratory are given in Tables I, II and III. These tests were run to determine levels of test precision.

Five replicate runs were made in the Deter-Meter detergency tester employing an experimental cloth under the following test conditions:

Detergent:
0.15% medium titer soap
0.05% sodium metasilicate
0.05% tetra sodium pyrophosphate
Temperature:
60°C (140°F)
Time:
3 min
Frequency:
100 cycles/min
Amplitude:
50 mm
Impact-surface spacing:
No 2
Reflectance:
Hunter Multi-Purpose Reflectometer

The data series in Table I was one of 12 such series that were run; the average spread of the twelve series was 0.98%

TABLE I

Run No	Swatches Per Run	Reflectance
1	1	32.5
2	1	32.9
3	1	33.3
4	1	33.3
5	1	33.5
Average		33.1
Spread		1.0%
Standard Deviation		0.4%
Coeff of Variation		1.2%

TABLE II

Run No	Swatches Per Run	Light Transmission of Solution
1	1	84.9
2	1	85.3
3	1	85.3
4	1	85.3
5	1	85.9
6	1	83.3
Average		85.0
Spread		2.6%
Standard Deviation		0.8%
Coeff of Variation		0.9%

(Since running this test, a new soiled cloth has been developed. It was designed specifically for turbidity use in the Deter-Meter detergency tester and has proved more satisfactory for such use than the type that was used in the foregoing experiment.)

and the average standard deviation was 0.37%. The greatest spread encountered was 1.3% and corresponding deviation was 0.5%.

Similar results (see Table II) were obtained using an experimental turbidity type cloth under the following test conditions:

Detergent:
0.75% Igepon T
Temperature:
60°C (140°F)
Time:
10 min
Frequency:
125 cycles/min
Amplitude:
50 mm
Impact-surface spacing:
No 2
Turbidity Measurement:
Lumetron Colorimeter

One of the difficulties encountered in laboratory testing has been lack of agreement in inter-instrument or inter-laboratory tests. In an effort to determine whether this inadequacy has been resolved, tests were run on two Deter-Meter detergency testers employing identical settings and detergent formulas, and soiled cloth, without any attempt being made to calibrate one machine against the other. The data from this series of tests is listed in Table III.

Tests were run to determine the range of soil removal effected by variation in dynamic input.

Test Conditions	Reflectance
Reflectance of the unwashed cloth (ACH No 114, Roll No 165)	22.4%
Minimum amplitude Minimum impact-surface spacing 25 cycles/min 3 min	27.7%
Maximum amplitude Maximum impact-surface spacing 220 cycles/min 3 min	57.8%
Result of two complete launderings of the same cloth (ACH No 114) in an average commercial laundry (Each wash consisting of: 3 suds, a bleach, 4 rinses and one sour. Total time of laundering—one hour).	58.5%

In addition to the tests reported here, experiments were run which indicated that more than one test could be run in a beaker of detergent solution without detectable error and that the redeposition error mentioned in the design objectives

TABLE III

Run No	Deter-Meter Detergency Tester A Reflectance	Deter-Meter Detergency Tester B Reflectance
1	32.5	33.7
2	32.9	33.1
3	33.3	33.1
4	33.3	33.3
5	33.5	33.3
Average	33.1%	33.3%
Standard Deviation	0.4%	0.2%
Difference in Averages	0.2%	

has been supressed due to the relatively large bath-to-cloth ratio employed. These two factors, especially the first, offer considerable aid in expediting test procedures.

SUMMARY

The instrument has been in use for about one year and the results of experiments and test procedures indicate that the design objectives originally set forth at the start of the investigation have been successfully met.

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Book Reviews

Progress in Chromatography 1938-1947

L Zechmeister
368 pages; $8.00
John Wiley & Sons, Inc (1951)

This book provides what might be called a "sequel" to "Principles and Practice of Chromatography" by Zechmeister and Cholnoky, published in 1941, and includes the literature up to 1938. In general, this second book maintains the same high standards and critical evaluation that made the first volume one of the most widely quoted books in the field of chromatography.

Not very long ago the chromatographic method was a tool, mentioned casually in text books on the techniques of organic chemistry. Today, it is a full-fledged field, whose researchers are providing new insights to many diverse and complicated problems. The literature of chromatography, as a consequence of its increased stature, is increasing at a transcendental pace. It has become virtually impossible to keep track of all the developments in this area without devoting more time than most people have available. Herein lies the value of Prof Zechmeister's book, for he seems to have performed an admirable job of collecting and evaluating literature in the period covered. Spot checks of many of the references found them to be accurate. The comments and discussion of these references seem justifiable.

Chapters I and II, on Principles and Methods respectively, should be very valuable to any one undertaking research in this area. Chapter VII on Natural Pigments, and Chapter VIII on Synthetic Dyestuffs should be of particular interest to the textile chemist. Also, of specific interest to textile research workers are sections on separation of amino acids from wool hydrolysite, silk fibroin, etc. Chapter XXIII on Inorganic Chromatography provides an excellent survey and discussion of a method that has not received adequate industrial recognition as yet. The section on theory appears somewhat weak but it should be borne in mind in considering its merits that the biggest advances in theory have taken place since 1947.

The print is easily readable and the figures in general are clear and well labeled. The photographs are not up to the standards set by the rest of the book and, in the reviewer's opinion, contribute little to the text.

All points considered, this book would seem worthy of a hearty recommendation as an addition to the textile chemist's library.—RED, Jr

An Introduction to Textile Finishing

J T Marsh
552 pages; $5.50
John Wiley & Sons, Inc (1951)

The first broad treatment of textile finishing within a single volume, this excellent new text is a typical Marsh production that is fully up to the very high standards set by its splendid predecessors. The chemical aspects of finishing predominate, but the mechanical side is not entirely neglected, for a long chapter devoted to finishing machines discusses the principles and operation of basic finishing machinery used for mechanical and chemical finishing of the various fibers. As previously noted, however, the emphasis is primarily chemical with particular stress on recent developments. At the same time some of the older commercial processes are critically examined in the light of modern research.

As stated in the very interesting preface, the author has obtained his material from his own extensive experience and from an exhaustive survey of the literature. Consequently the text is a clever combination of practical finishing together with fundamentals, practical processes being discussed in terms of theory. Where the material has been drawn from the literature, original references are given for further information. The discussion of finishing practice is completely objective, formulary being entirely avoided.

It must be noted that although this book has just been published in the USA, it was written in 1946. Also, being an English text, it contains some unfamiliar terminology. The book is well indexed, having both a name and a subject index. It has a short appendix containing density tables, a table of common pH indicators, and a temperature conversion table. Finally, there is a bibliography of books on finishing and a listing of journals wherein articles devoted to finishing may be found.

Another excellent treatise by an author who needs no introduction, this book will be warmly received by the American textile industry.—JBM

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OCTOBER 29, 1951

RAYMOND W JACOBY
1951 OLNEY MEDALIST

Olney Medal Award—

EIGHTH OLNEY MEDAL AWARDED TO R W JACOBY

THE Annual Banquet, traditional climax of AATCC National Conventions, provided the setting on October 19th for the presentation of the 1951 Olney Medal to Raymond W Jacoby of Ciba Company, Inc.

Mr Jacoby, the eighth recipient, was presented the award by President C Norris Rabold. Prior to Mr Rabold's presentation remarks, Elliot Broadbent spoke on "The Medalist—The Man" and Dr W George Parks on "The Medalist—The Scientist."

The text of each, as well as the Olney Medalist's address follow.

—♦ ♦—

The Medalist — The Man

ELLIOT BROADBENT

SOME time ago I was returning from the South with our Medalist. We had spent about a week together going around various plants, and in that time we had discussed about every phase of the textile business and particularly the finishing industry. Finally, I asked Ray, that if some rich relative were to leave him a lot of money, would he invest it in a finishing plant of his own? "No", he replied, "I would start a nonprofit research group specifically to handle problems of the textile industry". I was somewhat surprised and asked him why he would choose to use his money that way. He replied, "The finishing business and the textile industry in general have given me a good living all my life and I would feel that I was making some measure of repayment." I think that characterizes the man, particularly in this day when every one asks "What's in it for me?"

Mr Jacoby was born in Wilkes-Barre, Pennsylvania of Pennsylvania Dutch stock. He graduated from the local high school there and then attended Massachusetts Institute of Technology in Cambridge, graduating with a Bachelor of Science Degree in Chemical Engineering. He possibly inherited from his Pennsylvania Dutch ancestry a very vigorous intolerance. This intolerance does not extend to race, or creed, or political views, because he is happy and well satisfied to let any one have his own particular views on these subjects. His intolerance deals only with anyone who shirks the task before him. Mr Jacoby can be guaranteed to do his best toward the completion of any task assigned, and woe be-tide any associate who does not give his best. I have worked with our Medalist on many committees, and I can tell you from first-hand experience that he is no respector of persons. If the committee work begins to fall by the roadside, it makes not one bit of difference whether his associates are customers, or competitors, they feel his indignation alike if Mr Jacoby thinks that every one is not carrying his share of the load. The splendid record of accomplishments of these committees confirms his belief that anything worth doing is worth doing well.

In March, 1941, *Textile Age* published a paper by Mr Jacoby entitled "An Open Mind In Textile Finishing". I think this title epitomizes our Medalist's point of view. He is an ardent believer in the liberal exchange of opinions and experiences, and it has always been my observation that he at least tries to give as much as he receives. In his early days in the finishing industry, it was the custom to try to keep methods a secret. Ray rebelled against this practice very strongly. Thirty years ago, when such an outlook was rare indeed, he always tried to promote a free exchange of ideas.

While it may appear that the Medalist takes a pessimistic attitude toward every problem he tackles, such is not really the case. It is merely a manifestation of his attempt to envision every possible exigency which might arise and take steps to prevent failures before they can possibly happen. He is always looking to the future; what has happened, right or wrong, is water over the dam as far as he is concerned. So long as he has learned a lesson from the past, he knows that he is better equipped to face any difficulty of the future.

I have known our Medalist for almost thirty years, and although I have always had tremendous respect for his ability as a scientist and technician, I have a deeper admiration for him as a man with highly developed humanitarian instincts. His refusal to duck out from under a load which might be imposed upon him is one of his strongest characteristics. Back in 1922, when he was managing the Garnerville Print Works, he was faced with a problem which he could easily have shirked and said that the problem was not his. In that year there was a big anthracite coal strike. Most of the people who lived in Garnerville were working for his company. As the cold weather approached, the working people began to complain because they could not get fuel. The first thing Mr Jacoby did was to allow the people to come in to gather all the wood that was available in the company's yard, and at the same time he called a meeting of all the coal dealers in town to discuss the problem. When Mr Jacoby asked the coal dealers how they intended to take care of his people, they replied that there was a strike on at the time and they simply could not get the coal. In his usual forthright manner, our Medalist told the dealers that while he didn't want to become a coal dealer himself, if they could not solve the problem, he would. They assured Mr Jacoby that there was no coal available, either for him or for them—so he might as well forget the whole thing. Ray was brought up in the anthracite coal district and some of his schoolboy friends were now actively engaged in the coal business. He called up one of his old friends and told him that he wanted 1000 tons of coal immediately. His friend just reminded Ray that there was a strike on and it was impossible to get coal. This particular friend had been a fullback on the college team during his student days, and Mr Jacoby reminded him that no opposing team had been able to stop him in those days—so why should he let the coal strike stop him from coming through with the coal. Well, Mr Jacoby hit him in a rather tender spot, and the next day Ray received a call from his old school chum that 1000 tons of coal was on the way to Garnerville.

His interest in local affairs has always been one of Mr Jacoby's strong points. He has always been very active in the community and in the church, and has done an outstanding job in raising funds for his church. Although a comparatively newcomer to Mountain Lakes, N J, he has practically reached the status of a "town father" in that community. At one

time he was made chairman of a citizen's committee organized to preserve the quality of the community by checking an unsatisfactory real estate development.

I would not like you to think that Mr Jacoby excels in everything he undertakes—far from it. He has always taken an interest in athletic sports, but his efforts in that direction were not always successful. During his college days, he tried out for the track team. The coach asked him to take a short trot around the track, and that was the end of Ray's track career. The coach told him he ran like a sewing machine, in the same place all the time. He had similar experiences with golf. At one time he belonged to the Rhode Island Country Club, and one of his friends asked him if he were in arrears in his Club dues, locker room charges, etc. When Ray assured him that he was in good standing all around, his friend told him that it was perfectly all right for him to use the fairways, he need not confine himself to the rough and sand traps. He told me one day that after this remark he became so incensed that he went out and made a "hole in one".

After various attempts to develop a sport or hobby in which he excelled, he took up the collection of shell fish. By that I mean shell fish with the fish removed, and he is now a very ardent shell collector. Every year he goes down to Sanibel Island off the coast of Florida and spends his whole vacation collecting different types of shells.

It is fitting that I speak on Mr Jacoby, The Man, because in a measure I have contributed to his success in the lighter side of life.

I sometimes wonder what his entry into the Mountain Lakes Region would have been without my tutelage. With my guidance, he has become an authority on scientific gardening, an authority with the shaker during the cocktail hour, and a very accomplished poker player.

Mr Jacoby is a very apt pupil, and the old adage that "you can't teach an old dog new tricks" certainly doesn't apply to him. With the exception of the poker lessons, all of the instructions I gave him were free, but, as everyone knows, it always costs money to learn to play poker. I must admit, though, that after a few costly lessons, Ray became so adept at this game of skill that he cleaned out his teacher on one occasion.

These accomplishments, which I have taught Ray, are indeed small repayment for the many things he has taught me. I believe that anyone associated with him can say the same thing. He has proved himself a man in the highest sense in every walk of his well-balanced life. The AATCC should be proud that it has such a man in its organization. We all should be happy in the Olney Medal Committee's choice.

* * *

The Medalist—The Scientist

W GEORGE PARKS

IT IS frequently difficult to evaluate properly the tangible and intangible contributions of an individual to science, to the particular profession involved and to the civilization in which we live. It is sometimes necessary to apply the test of time and also to await the results of a critical review by qualified judges. However, in the case of Raymond W Jacoby, these difficulties are not encountered and it is easy to recognize immediately an outstanding leader in the textile industry and worthy recipient of the 1951 Olney Medal Award.

The Medalist was born in Wilkes-Barre, Pennsylvania, in 1889. He received his early education in the public schools of his native city and was graduated from the High School in 1906. At this point in his life he went to New England, specifically Boston, to continue his education at the Massachusetts Institute of Technology. The Bachelor of Science Degree in Chemical Engineering was awarded to Ray in 1910. The decision then was made to begin the work which we recognize and honor this evening.

Fortunately, Ray decided that the textile-finishing industry was worthy of his attention and efforts. During the period from 1910 to 1937 he served various textile-finishing industries, such as The Rockland Finishing Company, United States Finishing Company, and the Arkwright Finishing Company. The qualities of leadership and scientific ability which we honor ths evening were evident immediately. His progress was rapid in the industry where he held in rapid succession the positions as chemical engineer, foreman, division superintendent, superintendent, assistant manager and manager. In 1937 our honored guest joined the Ciba Company and apparently decided that this company provided the challenging opportunities and responsibilities he required because he has remained there to carry on his scientific work and service to the textile industry. The positions occupied include technician, research director, branch manager and department manager.

The scientific contributions of the Medalist have been many and varied, though the space available will not permit a complete record at this time. The evaluation of these scientific contributions is not difficult. For many years the work that Ray has done has been outstanding in the textile industry. He has successfully applied fundamental scientific information and research laboratory results to solve practical everyday problems in the industry. Ample evidence for the support of these statements is provided by the scientific papers which he has published and the patents which have been granted based on his fertile imagination and subsequent investigation and reduction to practice. He has always shared his knowledge and information with his colleagues in our industry. Numerous publications have appeared in the *American Dyestuff Reporter, Textile Age, Daily News Record,* and many trade journals. He has lectured extensively in both the United States and Canada on textiles and textile processing.

One of the early problems that interested Ray was the large amount of heat released in a vat dye ager. The source of this heat was believed to be the heat of reaction during the reduction of the vat dyes. In 1925 it was demonstrated that most of the excess heat was caused by the liberation of the latent heat of vaporization of the steam, which was converted to moisture and absorbed by the cloth and print paste. The results of these investigations formed the basis for a patent for one of the earliest modifications designed to eliminate this excess heat (U S Patent 1,663,846, March 27, 1928).

An extensive survey of vat printing pastes was completed in 1937. The results obtained were of considerable value in advancing the industry. They were made available to everyone by publication in the *American Dyestuff Reporter,* June 27, 1938. The subject was "Vat Printing". This investigation of vat printing pastes was continued, and in 1943 the affinity of vat printing paste thickeners for reduced vat dyes was demonstrated and measured. The results of this investigation constituted an important part of the Intersectional Contest Paper presented by the Rhode Island Section at the Atlantic City Convention in 1944. The value of the work was immediately recognized and the paper was awarded the first prize.

It was known that mercerized cotton dyes darker than cloth not mercerized. This effect was generally believed to be caused by an increased affinity for dyes which the cloth obtained as a result of the mercerization. In 1945 our guest of honor demonstrated that there was no increase in the amount of dye present. The increase in depth of shade was largely caused by an alteration in the cloth with the result that less light was reflected. The reduced reflection of light caused shades to appear darker. This work was published in the *American Dyestuff Reporter* of June 28, 1946, under the title, "Some Aspects of Color". This paper has been widely referred to in publications in this

country and abroad.

The effect of thermosetting resins on fabric stabilization was reported in the *American Dyestuff Reporter*, March 31, 1941. The use of acid colloids of resins on textiles was investigated. The results obtained formed the basis of U S Patent 2,431,562, November 25, 1947.

Textile processing has been the principal interest of our 1951 Medalist during his professional life. His varied interests are indicated by a partial list of the problems investigated, such as tensile strength of cotton yarns, production of jacquard effects by printing cotton fabric with a design and process for production, treating printed or dyed fabrics and processes for improving the fastness of dyed fabrics. Important contributions to science and to the textile industry have always resulted when Ray investigated a problem. He has always been ready to serve the industry whenever possible. Many important contributions have been made to the dyeing and finishing problems on textile fabrics for the Armed Forces.

The American Association of Textile Chemists and Colorists has always received his loyal and enthusiastic support. Considerable time and effort have been spent on the activities of the Association in the sincere desire to serve the textile industry and those who are dependent upon it. He has served as Chairman of the Rhode Island Section. His committee assignments and responsibilities now include: National Councilor; Chairman, Board of Editors, Monograph No 2; National Research Committee and Subcommittee; Colour Index Committee and two Subcommittees; Technical Program Committee; Chairman, Sectional Advisory Research Committee; Sectional Intersectional Contest Committee.

Raymond W Jacoby, you have been selected to receive the highest honor awarded by the American Association of Textile Chemists and Colorists. It is with complete assurance and confidence that I state that the award is merited both as a scientist and as a man. Your fellow workers both in and for the industry are proud to honor you. We join hands and extend to you our congratulations this evening.

* * *

Olney Medal Award Presentation

C NORRIS RABOLD

R W JACOBY, you have been selected as 8th Olney Medalist by the committee appointed for this purpose.

The award is presented to those persons who have made outstanding contributions in the field of textile chemistry, including the development of chemical agents, or chemical processes used in the manufacture of textiles, or methods for their evaluation.

Because of your extensive knowledge in the field of textile chemistry, the committee unanimously decided you were eminently qualified for this award. Over the years, you have constantly brought forth new ideas and methods. With your advice and assistance, many of us have become better chemists and better technicians. Not only by our own direct efforts, but also through your willingness to impart your knowledge and ideas to others have you aided the progress of our industry. By word and deed, your contributions to our scientific advancement have been many.

Everyone knows you as a friend, everyone appreciates your unselfishness, everyone realizes what you know is his for the asking. I stress these qualities for they are definitely in keeping with the objects of our association and decidedly fitting for the recipient of this award. May this medal always remind you of our esteem for you as a man and our respect for you as a scientist.

Raymond W Jacoby, I now present to you the Olney Medal for 1951.

THAT MOST EXPLOSIVE WORD

(Olney Medalist Address)

RAYMOND W JACOBY

MR PRESIDENT, Olney Medal Committee, Members and Guests of the American Association of Textile Chemists and Colorists: I am humbly and sincerely grateful. There are great moments in the lives of everyone, but few people are privileged to experience a moment as great as this one.

It is forty-one years since I started my association with the textile industry. Since that time, it has furnished a livelihood for my family and me. During that period, I have always felt that, no matter what one acquired of position or material things, his life was a failure if he did not make a contribution to the industry in which he served. Therefore, to the limit of my ability, I have tried to make such a contribution. Now I find that my efforts have back-fired, and instead of my making a contribution to the industry in which I served, that industry is making its greatest contribution to me. So, I repeat, I am humbly and sincerely grateful.

When I began my association with the textile industry, there was no AATCC. In fact, there were very few chemists in that field. Great emphasis was placed upon what was called "practical knowledge", with but scant regard given to what was referred to as "book learning." There was no exchange of ideas, and what information or misinformation was had was jealously guarded and passed on from father to son, or from an older person to a favored protégé.

Many people did not see how a chemist could be of any use in the production of textiles. My first employer told me that he did not know what my duties would be. He simply said that he would build a laboratory for me, and then I would be on my own and should do anything which I thought would be of help.

My first activities were in the bleachhouse, as this was the start of processing and also because some chemistry was involved. The bleacher was a man of the old school and was determined that no one was to learn the deep secrets of bleaching. He knew nothing about titration, but did realize that the strength of the various solutions used should be controlled. He had a little triangular shelf built in a secluded corner of the bleach house. Beside it was a cupboard which was kept carefully locked. When he wanted to test the caustic solution for the kier charge, the chemic solution, or the sulfuric acid solution for the white sour, he would secure a dipper of it and carry it over to the corner. He would unlock the cupboard, take out a cylinder and a hydrometer and place the cylinder on the shelf. Some of the solution was poured into the cylinder; then standing close and holding out one side of his jumper jacket as a further shield so no one else could see, he would place the hydrometer into the solution. The fact that the solutions being tested were about 2°, together with the fact that on the hydrometer scale 2° was about one-quarter

of an inch, did not prevent the bleacher from believing that the concentrations of solutions were carefully controlled.

It was realized that the sulfuric acid used in the white sour should be entirely washed out of the goods. The bleacher knew nothing of indicators and spurned the suggestion of any such "new-fangled chemicals". He had an infallible method. Periodically, he would walk over to the pile of white goods, pick up an end of the cloth, put it into his mouth and suck on it to see if he could taste any acid. He said he would give more for the tip of his tongue than for any solution a chemist might offer.

In those days, the drug-rooms of many dye-houses were unique in the matter of measuring equipment. In some cases, this consisted of two sizes of spoons——tablespoons and teaspoons. With such accurate measurement, it was perfectly obvious that if a lot did not come up to shade it was clearly the fault of the dyes.

Even in those days, one of the functions of the plant chemist was to interview the salesmen who called. Some of their technical discussions were really amazing. One salesman wanted to interest me in his "soda". I asked him whether he meant caustic soda or soda ash and he replied that it was neither, but was just "soda". When I inquired if, perhaps, it was bicarbonate of soda, I was told no, it was just "soda". Then I wanted to know what we would do with it if we bought it, and the answer was that it was used in kier-boiling. When I indicated that it must be either caustic soda or soda ash, he told me that it was a form of soda ash but different from the ordinary types in that it was perfectly pure. He said, in fact it was so pure that it was absolutely neutral. You can realize my amazement at learning of a form of soda ash that was absolutely neutral, so I immediately requested that he tell me more. Sensing my interest, he said, "Do you know what"? When I agreed that I did not "know what", he continued, "you know that if you put powdered caustic soda on your tongue it will burn." I agreed that that was not an over-statement, and then he asked, "Do you know why?" You can appreciate that I could not afford to miss this opportunity to obtain some post-graduate training in chemistry at so little effort and at no expense, so I replied, "No, why?" Then, leaning close as he shared his great secret with me, he said, "It is because there is acid in caustic." My startled exclamation was "No!" Seeing that he had my entire interest, he continued with the climax to his story. "I will tell you another thing", he went on, "If you put caustic soda on your tongue and it starts to burn, and then you sprinkle on some of our soda, it is so neutral that it will neutralize the acid in the caustic and stop the burning."

As you can imagine, those were interesting days. Many of the situations encountered were quite confusing. Sometimes things did not work out the way the text books indicated. This did not mean that the text books were wrong, but rather, that we were not dealing with simple chemical reactions. We had situations in which time, temperature, concentration and other factors played an important part. There was so very much to learn, and at the same time there was very much to unlearn. But, is that not true of our entire life?

Think back to your earliest days that you can remember. First you learned to count; you were very proud when you could count to ten. You started on simple arithmetic. You said, "One and one makes two." You repeated it over and over again until it became firmly fixed in your mind. Then you had to unlearn it, for you found out that one and one do not make two unless the objects are identical. One lion and one lamb do not make two—they make one fat lion. One man and one woman go to the marriage altar to be joined together in holy matrimony. One husband and one wife do not make two, they make one, but sometimes it takes a little while to determine which one. You learned the letters of the alphabet, how to put them together to form simple words, and that certain combinations of letters are pronounced a certain way. After you learned that, you had to unlearn it, for you found out that oftentimes the same combinations of letters could be pronounced in several other ways.

You learned how to put words together to form a sentence, and that a certain arrangement of words had a particular meaning. Then you discovered that, by a slight change in emphasis or punctuation, the same arrangement of words could have an entirely different meaning. For example, when a professor asked a student a question, the student hesitated a moment and then said, "What do you think?" The professor replied haughtily, "I do not think, I know." The student's immediate response was, "I do not think I know, either."

So it goes through life. It is a continually expanding spiral of learning and unlearning. Perhaps this is as it should be. On the other hand, may it not be due, in part, to the way in which we consider our formal education? The best conception of this that I have encountered was given to us on our first day as Freshmen. One of the professors said, "What you derive from the four years that lie ahead of you will depend upon the way in which you view your work. You are not here to accumulate a mass of facts, figures and information. You are here to develop your mind. If your body needs development, you go to a gymnasium and exercise it. Consider, therefore, that you are starting on a course of mental gymnastics. You are here to learn to think".

Is not the ability to think, and to think properly, a long step forward in formal education?

When one has learned to think, he thinks about his work, the problems involved in it, the accomplishments of the past, and the opportunities of the future. While you are thinking of all of these things, I would like to ask you, "What one word is very vital to all of them?" What one word can open the door to countless opportunities? What one word can be embarrassing, confusing and even explosive? If you think there is no such word, I would like to differ with you, as I believe there is such a word. It is a simple little word of three letters—"why".

Many of you, particularly at the start of your career, have observed something which you considered very unusual or significant. Full of enthusiasm, you have gone to an older, more experienced person to relate your findings. You have seen him look upon you with condescension, seen on his face a look of superiority, and heard him say scornfully, "Everybody knows that." If you feel completely rebuffed and go away ashamed of your lack of knowledge, you will have gained nothing and lost much. On the other hand, if you hold your ground and concede that while everybody may know it, you want to know "why", that look of superiority may explode into one of confusion and embarrassment.

How often have you heard people speaking of some development say that it is so simple and obvious that it should have been done long ago? Countless people observed and passed by. So it went until someone came along, observed and then applied that explosive word "why". Undoubtedly, that word "why" has resulted in countless developments of products, processes and equipment. Undoubtedly, unnumbered more await the creative impulse of that word "why".

Today, conditions are far different from those described at the outset. Now we have our great AATCC, which has won international recognition, providing a medium for the exchange and dissemination of information and ideas, and which, of itself, has contributed largely to the progress that has been made.

Now we have thousands of chemists serving the textile industry. Their knowledge is no longer spurned as "book learning", but is eagerly sought after and highly prized.

When I started my career, continuous bleaching was the hope and goal of many people. The J box was developed so that chemicking and souring could be done continuously. It was conceded by most people,

including some who had aided in the development of the J box, that this was as far as it could go. Goods must be kier-boiled for many hours under pressure, and such a process could not be made continuous.

When synthetic fibers first appeared as "artificial silk", they aroused tremendous interest. It was very evident, however, that they would never be more than chemical curiosities. They would never amount to anything commercially. They could not be produced uniformly—every filling change dyed a different shade. They could not be wound, woven, or finished without producing shiners.

When information regarding the pad-steam process for vat dyeing first became available, a company which prides itself on having a large and highly-trained technical staff made a thorough study of the proposed method. Its findings were that it would not be practical, as an anthraquinone vat color could not be completely reduced in twelve to fifteen seconds.

These were not the mutterings of obstructionists who always find fault with anything that is new or different. They were the conclusions of people who prided themselves on their knowledge of the industry.

Why must goods be boiled for many hours under pressure?

Why cannot synthetic fibers that are uniform and satisfactory be produced commercially?

Why cannot an anthraquinone vat color be completely reduced in twelve to fifteen seconds or less?

All of us, as well as the entire industry, can be very thankful that there were people who used this word "why" to advantage. Today, billions of yards of cloth are being bleached by an entirely continuous process. Today, the production of uniform and satisfactory synthetic fibers and fabrics runs into hundreds of millions of pounds. Today, many millions of yards of cloth are being vat-dyed quickly, economically and successfully by the pad-steam process.

One could go on endlessly, citing similar instances of ideas which might have died at birth had not some person or persons arisen who used that explosive word "why" and blew to pieces the inhibitions and preconceived ideas which existed. Indeed, that word "why" has been a mighty influence in our progress.

At this time many new products, new processes and new types of equipment are receiving attention. Already the barrage of criticism has started. We hear many logical explanations of why they are doomed to failure. We can feel confident, however, that many of them will succeed because every objection will be blasted away with that forceful word "why".

You chemists, colorists, technicians and laboratory workers may sometimes think you are going up a blind alley, that your work is routine, devoid of interest and opportunity. If such is the case, think of the number of factors connected with your work which you take for granted. The whole picture can change if you apply that word "why" to every detail, no matter how insignificant it may seem to be. Start using that word "why" whenever opportunity permits. You will be amazed at the answers you receive and astounded at the new vision you will have of the industry in which you are serving.

"Why do it this way?"—"It is standard practice."

"Why do you get these results?"—"Well, we always do."

"Why do you use this quantity?"—"That is the amount that everybody uses."

"Why not do it this other way?"—"I do not know; we have never tried."

"Why is this?"—A shrug of the shoulders.

It will not be long before you realize that you are not in a blind alley. Instead, you are in the wide open spaces where roads lead off in all directions with countless opportunities on every side. You will find plenty to challenge all of your ability and energy, plenty to maintain your interest and enthusiasm. You will find that your mind need never have an idle moment, and that there are unlimited opportunities to contribute to the industry in which you serve.

You executives who are burdened with the responsibility of production, quality, cost, processes, materials, distribution, and other manifold factors which are combined in the operation of an industry can also use that word "why" to advantage. Undoubtedly, you receive numerous reports covering all the vital details of your business. Pause for a moment and think of how often you look at these figures and take them for granted. You watch every minor variation. You are pleased when they show a slightly favorable change, are disturbed when they go the other way. But why accept what you believe to be normal or average? Consider how carefully you follow the figures of average cost of dyes, chemicals, and finishing material; consumption of steam per yard of goods; production per man hour or machine hour; and total cost per unit of every operation. Then start digging beneath the surface of those figures to see whether every item which affects them is proceeding under optimum conditions. If you have no inhibitions as to what is average, if you take nothing for granted, but apply that word "why" to all of the figures which you study, you will discover countless opportunities for improvement. So, to you executives, I repeat, use that word "why". It can make the lean years much less lean, and the fat years much fatter.

The difference between the executive who continually uses that word "why" and a competitor who does not is similar to that between the two dairy men, one of whom advertised "Milk from contented cows", and the other who advertised "Our cows are never contented, they are always striving to do better".

The AATCC can well be proud of the accomplishments of its various research committees. However, all cannot serve on these committees, and there is a limit to the number of projects which it can sponsor. On the other hand, if you examine the patent literature and the *Proceedings* of the AATCC, you will realize the enormous number of developments which have been accomplished by men who made themselves a one-man research committee. The opportunities are there. They are yours for the taking. The files of the *American Dyestuff Reporter* reveal innumerable instances of hitherto well-established ideas which have been shattered by the initiative and efforts of one individual. When you start using that word "why", you will be embarking upon a research project of your own.

"Why" is a little word, full of dynamic power, and like any confined energy, it may explode suddenly and unexpectedly. However, in the few rare instances in which this occurs, the damage done is inconsiderable compared with the tremendous benefit derived when it is used properly.

"Why" is an explosive word which can be used to blast away those impediments that bar your progress.

"Why" is a word which can change a routine job into one full of absorbing interest and opportunity.

"Why" is a word we should use over and over again. It will make our work more interesting and profitable to ourselves; our services more valuable to our employer; our company more profitable to its employees, executives, and stockholders; our business more constructive to the industry of which it is a part; and our industry more vital in the economic life of our nation.

The frequent use of that word "why" is recommended not solely because of the possibilities of material gain. Much more valuable, and much more durable benefits can result. Every time you use that word "why" constructively and successfully, you will have made a noteworthy contribution to the industry in which you serve. You will have added another segment to the road which those who follow after you must travel. This thought is expressed splendidly in the poem "The Bridge-Builder" by Will Allen Dromgoole:

An old man going a lone highway
Came at the evening, cold and gray,
To a chasm vast and wide and steep,
With waters rolling cold and deep.
The old man crossed in the twilight dim,
The sullen stream had no fears for him;
But he turned when safe on the other side,
And built a bridge to span the tide.
"Old man," said a fellow pilgrim near,
"You are wasting your strength with building here,
Your journey will end with the ending day,
You never again will pass this way.
You've crossed the chasm, deep and wide.
Why build you this bridge at eventide?"
The builder lifted his old gray head.
"Good friend, in the path I have come," he said,
"There followeth after me today
A youth whose feet must pass this way.
The chasm that was as nought to me
To that fair-haired youth may a pitfall be;
He, too, must cross in the twilight dim—
Good friend, I am building this bridge for him."

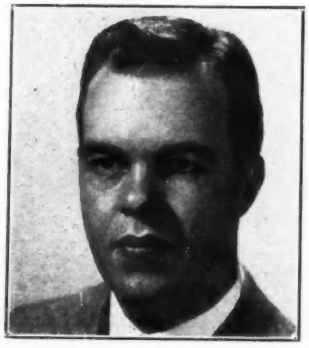
—◆ ◆—

Roy Presents Midwest Section Paper at Convention

IN a last minute decision, the Midwest Section entered the National Intersectional Contest at New York. Their paper, "A Discussion Concerning Developments on New Fibers", was presented by A L Roy of the Dean & Sherk Company, Lawrenceburg, Kentucky.

Members of the Section's Contest Committee were as follows:

L J Armstrong, *Chairman*
A L Roy, *Speaker*
A T Brainerd
V H Lawrence
J H Jones
L O Meyer
E W Lowe
J E A Schroder
A J Olson



L J Armstrong

Membership Applications

SENIORS

George J Bonifanti — Finisher, Double Woven Corp, Dunmore, Pa. Sponsors: J E Thissen, Jr, S R Tomko.

William O Fischer—Vice President, Milwaukee Dye & Bleaching Co, Milwaukee, Wis. Sponsors: A G Alexander, C M Robbins.

Frank E Hempel—Treasurer, Milwaukee Dye & Bleaching Co, Milwaukee, Wis. Sponsors: R O Brenner, J E A Schroder.

Samuel S Levine—Technical Sales & Service Supervision, Siegel Chemical Co, Brooklyn, N Y. Sponsors: P J Wood, L P Brick.

Lawrence J O'Neill—Chemical Salesman, American Cyanamid Co, Waterbury, Conn. Sponsors: A E Neil, Jr, H A Wormwood.

JUNIOR

Robert N Armour — Junior Executive, American Aniline Products, Inc, Lock Haven, Pa. Sponsors: G L Armour, J J Marshall.

ASSOCIATES

David S Holt—Asst Production Manager, Robertson Bleachery & Dye Works, New Milford, Conn.

Harry M Martin—Technical Representative, Sidney Blumenthal & Co, Shelton, Conn.

Mario Palumbo — Chemist (consultant) State Lab of the Italian Custom House, Rome, Italy.

STUDENTS

Edward L Katz—Rhode Island School of Design. Sponsor: H B Sturtevant.

Leo Peloquin—Rhode Island School of Design. Sponsor: H B Sturtevant.

Lawrence W Fisher—Lowell Textile Institute. Sponsor: E E Fickett.

Margaret J Peters—Lowell Textile Institute. Sponsor: E E Fickett.

Ananka K Setty—Lowell Textile Institute. Sponsor: E E Fickett.

Sheldon Urowitz — N C State College. Sponsor: H A Rutherford.

APPLICATION FOR TRANSFER TO SENIOR MEMBERSHIP

Albert E Medas

EMPLOYMENT REGISTER

This column is open for two insertions per year, per member, without charge. Blanks can be obtained from, and filed with, the Secretary of the Association, Lowell Textile Institute, Lowell, Mass. It is understood that these will be open to inspection by prospective employers who can obtain further information from the Secretary.

51-17

Education: 2 years chemical engg; B S in chemistry and dyeing, Philadelphia Textile Institute.
Experience: 6 years; chemist and colorist, dyer and bleacher, supervisor for warp mercerizing.
Age: 34; married; references; Central Atlantic states preferred, but not essential.
10-15, 10-29

51-18

Education: B S, New York University.
Experience: export sales.
Age: 33; married; references; vicinity of New York, N Y, preferred.
10-15, 10-29

51-19

Education: Philadelphia Textile Institute, 3 years chemistry and dyeing.
Experience: superintendent of dyeing and finishing, hosiery, felt and hair.
Age: 30; married; references; vicinity of Philadelphia preferred.
10-15, 10-29

51-20

Education: B S, Bradford Durfee Technical Institute.
Experience: dyer, worsted and nylon yarns.
Age: 24; married; references; central or north Atlantic coast preferred.
10-15, 10-29

51-21

Education: B S, Georgia Institute of Technology, 1951.
Experience: textile technologist.
Age: 26; single; references; position as textile technologist or dyer trainee desired, in New England or Middle Atlantic States.
10-15, 10-29

Calendar of Future Meetings

COUNCIL: Nov 16 (Hotel New Yorker); Jan 18, 1952; April 18, 1952; June 20, 1952; Sept 19, 1952 (all in New York); Nov 6, 1952 (Boston).

GENERAL RESEARCH COMMITTEE: Dates and sites are the same as the Council's.

NATIONAL CONVENTIONS: 1952—November 6-8, Boston, Mass; 1953—Sept 17-19, Hotel Stevens, Chicago, Ill; 1954—Atlanta, Ga.

HUDSON-MOHAWK SECTION: Dec 7, Feb 1, 1952, Mar 21, 1952, May 2, 1952 (all at Jack's Restaurant); June 20, 1952 (Annual Outing).

NEW YORK SECTION: Nov 30 (Swiss Chalet); Jan 11 (Hotel New Yorker); Feb 29 (Hotel McAlpin, New York); April 18 (Swiss Chalet); May 16 (Swiss Chalet); June 20 (Outing).

NORTHERN NEW ENGLAND SECTION: Nov 30 (Annual Meeting, Boston, Mass), Jan 25 (Boston); Mar 7 (MIT); April 18 (LTI); May 16 (Andover Country Club); June 6 (Annual Outing, Merrimack Valley Country Club); Dec 6 (1952 Annual Meeting, LTI).

PACIFIC SOUTHWEST SECTION: Jan 11, 1952; March 28, 1952.

PHILADELPHIA SECTION: Dec 7, Jan 18, 1952 (both at Kugler's Restaurant, Philadelphia).

RHODE ISLAND SECTION: Nov 16 (Johnston's).

SOUTH CENTRAL SECTION: Dec 1 (Hotel Patten).

SOUTHEASTERN SECTION: Dec 8 (La Grange, Ga).

WESTERN NEW ENGLAND SECTION: Nov 9, Dec 14 (both at Rapp's Restaurant, Shelton, Conn).

Photos of the
Rhode Island Section Outing—1951
Wannamoisett Country Club
Rumford, R I

Four-Way Golf Tie Features Rhode Island Section Outing

A FOUR-WAY tie for low gross enlivened the golf tourney at the annual outing of the Rhode Island Section at Wannamoisett Country Club, Rumford, R I, on June 22d. A playoff was arranged between Ralph Hawes of Apponaug Division, Aspinook Corp; W T Clarke of Arnold Hoffman & Co, Inc; and Jeff Carlson and Ralph Carlson, both of Lincoln Bleachery & Dye Works. All four had 75 in the tourney, and the playoff was won by Jeff Carlson with a 76.

Other prizes were awarded to W T Clarke of Arnold Hoffman Co for the longest drive, which was reported as "well over 400 yards"; Ralph Carlson (with a handicap of 10) for the low net with a 65, and Jeff Carlson (with a handicap of 9) for second low net. Second low gross prize went to David Meikle of Stillwater Worsted Mills with a 76.

IDENTIFICATION OF R I SECTION OUTING PHOTOS

(from left to right on all pictures)

TOP ROW:

(1) Outing Committee—
Front: A N Graves, P G Kolupaev, J A Harley, E Plummer, H Travis, A J Lombard.
Rear: J J Roarke, C F Stokes, F Grant, J Davies, J Wilson, H Gorton, M Quigley.

(2) *Front:* H Leach, G Dobson, W Croasdale.
Rear: F Puleo, J Falcon, W Taylor.

(3) D Meikle, A McKenzie, G Slade, R Harrison, E K Johnson (to the rear).

SECOND ROW:

(1) M Weisberg, J A King, E Parker, L McKenzie.

(2) E Kent, W Brothers, unidentified, W Murray, R Gavitt, K Johnson, J Shore.

(3) R Farrell, F Diedrich, M Gurley, S Straw, L D Fleming.

(4) J Roarke.

THIRD ROW:

(1) A Grover, H Travis.

(2) P Kolupaev, J A Harley.

(3) E Allard.

(4) I S Hurd, J E Buonanno.

FOURTH ROW:

(1) J Carlson, 1951 Section Golf Champion.

(2) J A Harley, H A Stanley.

(3) R Carlson, J Carlson.

(4) R Highling.

(5) J G Benedict, L Roberts.

The planning of Peter G Kolupaev, Chairman of the Section, and a committee under the direction of John A Harley, Ciba Company, Inc, Outing Chairman, brought out a record crowd of 399.

The committee included: James Davies, Arnold Hoffman & Co, and Henry Stanley, Jr, Ciba Co, Inc, *golf;* Elliot Plummer, Cook Yarn Dye Mills, and Herbert Travis, Rohm & Haas Co, *dinner;* Kenneth Everett, Powdrell & Alexander, *photography;* Harrison Gorton, Jr, American Aniline Products, *reception;* Newton Graves, Franklin Process Co, *donations and tickets;* John Wilson, General Dyestuff Corp, *publicity;* John Roarke, Lincoln Bleachery & Dye Works, *parking;* and Robert Thomas, Rohm & Haas, *printing.*

The committee on prizes included: Fred Grant, Synthron, Inc, Alfred Lombard, Geigy Co, Matthew Quigley, Interchemical Corp, and Charles Stokes, Carbic Color & Chemical Co.

OTHER PRIZE WINNERS

In Class B golf, Robert Wood of Calco Chemical Division won low gross with 84 and Kenneth Lydic of Owens-Corning Fiberglas Corp was second with 88. Low net went to G Lindsey with 85-25-60 and second to Matthew Quigley of Interchemical Corp with 90-20-70.

In Class C, Charles Stokes of Carbic Color & Chemical Co won low gross with 93 and Bernard Rivers of Crown Mfg Co was second with 95. Low net was won by Dr George Gantz, Lincoln Bleachery of Lonsdale Co with 100-39 for a 61; William Croasdale of Bradford Dyeing Association took second with 102-40-62.

Carroll Peck of George Mann & Co won the putting contest prize of a new putter while R Wilson of Cook Yarn Dye Mills won three golf balls for nearest to the pin—less than a ball's width away.

Other prizes went to Brackett Fernald of Esmond Chemical Co for 11 5's; to James Connell of Enterprise Dye Works for 10 6's; and to J Derrig for eight 7's.

SCORES

SCORES IN CLASS A WERE: E A Peck, American Aniline Products, Inc, 80-11; R Wilson, Cook Yarn Dye Mills, 99-15; L Strickland, Guerin Mills, 88-14; H Rocheleau, Guerin Mills, 94-14; James R Redmond, Interchemical Corp, 87-15; Delbert Gifford, Sessions-Gifford Co, Inc, 87-15; A Harrison, A Harrison & Sons, 80-10; A L Gondyke, General Dyestuff Corp, 84-9; Frederick Phil, Russell Mfg Co, 93-15; David Meikle, Stillwater Worsted Mills, 76-8; T Larson, Carbic Color & Chemical Co, 77-6; Ralph Hawes, Apponaug Division of Aspinook Corp, 75-6; W T Clarke, Arnold, Hoffman & Co, Inc, 75-8; Everett Law, Bradford Dyeing Association, 85-8; E J Allard, National Aniline Division of Allied Chemical & Dye Corp, 92-12; T Anderson, J U Starkweather Co, 86-12; J McDermott, Dempsey Bleachery, 91-14; T Daley, Dempsey Bleachery, 93-15; W J Cook, Cook Yarn Dye Mills, 79-6; H S Travis, Rohm & Haas, 82-10; Brackett B Fernald, Esmond Chemical Co, 85-10; Emory Richards, Florence Dye Works, 80-13; Sol Palais, 87-15; William Brown, Royce Chemical Co, 90-11; R Andrew, U S Oil Co, 87-14; George E Montgomery, Arkansas Co, Inc, 81-10; G Mulligan, J U Starkweather Co, Inc, 92-14; Joseph E Buonanno, Atlantic Chemical Co, Inc, 82-13; J Carlson, Lincoln Bleachery, Lonsdale Co, 75-9; Ralph Carlson, Lincoln Bleachery, 75-10; and R Harrisson, Borden & Remington.

SCORES IN CLASS B WERE: H W Wilkinson, American Thread Co, 95-24; G Allan Dickson, Cook Yarn Dye Mills, 89-18; Elliott Plummer, Cook Yarn Dye Mills, 93-22; A D Nute, American Cyanamid Co, 103-25; T S Clarke, E I du Pont de Nemours, 112-23; E H Gamble, du Pont, 91-18; H Kinniburgh, Cranston Print Works, 102-24; Matthew Quigley, Interchemical Corp, 90-20; Kenneth Lydic, Owens-Corning Fiberglas Corp, 88-22; Frank Cutter, Rumford Chemical Co, 96-25.

Also, Bob Beaven, Rumford Chemical Co, 103-24; Russell Broadhurst, Russell Mfg Co, 108-25; George A Slade, Borden & Remington, 101-21; Andrew MacKenzie, Stillwater Worsted Mills, 103-21; W H Eastburn, Mathieson Chemical Co, 95-16; A F Bailey, E I du Pont de Nemours, 98-22; Robert Wood, Calco Chemical Division of American Cyanamid Co, 84-16.

Also, Douglas Martland, Cranston Print Works, 92-16; Marcel Delys, Enterprise Dye Works, Inc, 103-20; William H Turner, Geigy Co, 91-17; A Lombard, Geigy Co, 97-23; Frank Coburn, du Pont, 98-17; James Worton, Geigy Co, 90-19; Ernest Chornyei, Bradford Dyeing Association, 107-25; Arnold Troy, E F Drew & Co; Donald Eccleson, Warwick Chemical Co, 90-18; Sloan Stribling, Warwick Chemical Co, 100-17; Arthur McLean, Glenlyon Print Works, 96-17.

Also, H W Baldwin, du Pont, 102-20; William Connell, Enterprise Dye Works, 93-20; T Connell, Joan Plush Mills, 100-24; B L Mann, George Mann & Co, 104-24; Leon McKenzie, Ken Products Co, 93-18; E Haigh, Apponaug Division of Aspinook Corp, 104-24; James Davies, Arnold, Hoffman & Co, 98-18; Kenneth Dustin, Arnold Hoffman & Co, 102-24; J Brazel, Textron, 110-24; W Green, Warwick Chemical Co, 94-18; S Straw, American Textile Co, 90-18.

Also, W A Turner, American Textile Co, 91-16; George E Wilson, Wilson Co, 96-16; Richard Lewis, Providence D B & C, 96-25; R Davie, Stafford Printers, 126-25; D Payne, Warwick Dyeing & Finishing Co, 96-24.

CLASS C SCORES: William Brosnan, Esquire Processing Co, 107-26; G C Grant, Synthron, Inc, 99-28; A H Rant, Laurel Soap Co, 102-34; B Rivers, Crown Manufacturing Co, 95-28; C A Gaudette, Apponaug Division of Aspinoak Corp, 111-30; F H Casey, Sandoz Chemical Co, 104-27; P D Caine, Becco Sales Co, 110-30; J A Harley, Ciba Co, Inc, 101-26.

Also, Gerald Stackpole, Cranston Print Works, 142-38; George H Wood, Apponaug Division of Aspinook Corp, 112-32; Ralph Miller, Corn Products Sales Co, 105-30; F Manter, Cranston Print Works, 105-32; R England, Monsanto Chemical Co, 108-26; A Risk, Pontiac Finishing Co, 106-30; R Gagnon, Owens-Corning Fiberglas Co, 141-40; J O'Flahavan, Owens-Corning Fiberglas, 117-35; Ralph Turner, Rumford Chemical Co, 123-40; J G Loxley, Heyden Co, 138-40; A L Dubeau, Mathieson Chemical Co, 125-37.

Also, E H Summersgill, du Pont, 114-38; H L Sager, du Pont, 111-30; J L Anderson, Franklin Process Co, 102-30; E K Johnson, Franklin Process Co, 100-26; G Goulet, Maplewood Yarn, 106-30; William Small, Calco Chemical Division of American Cyanamid Co, 108-30; J Derrig, 111-30; Claude O Witze, Synthron, Inc, 124-40; W C McBeth, Carbic Color & Chemical Co, 95-26; George Dobson, Bradford Dyeing Assoc, 101-26; William Taylor, Bradford Dyeing Assoc, 102-26; William Croasdale, Bradford Dyeing, 102-40; James Falcon, Arnold Hoffman & Co, 99-26; H Leach, Arnold Hoffman & Co, 99-26.

Also, Bryce Rhodes, Synthron, Inc, 120-40; E Wilks, 98-30; Leonard Costello, Stein Hall & Co, 106-30; G Lindsey, 89-25; W Armell, Dorlexa Dyeing & Finishing Co, 110-28; Robert Wilks, American Thread Co, 112-40; H G Follett, Borden & Remington, 130-40; A Hustwit, Bradford Dyeing Association, 111-40; Tom Bourne, Borden & Remington, 112-35; Joe Dube, Damar Wool Combing Co, 115-40.

Also, Carol Johnson, Damar Wool Combing Co, 97-28; Ed Doherty, Damar Wool Combing Co, 103-28; G R Ozesman, 109-29; Roy Highling, Bradford Dyeing Assoc, 108-30; Lionel A Roberts, Valley Lace Co, 99-25; John Benedict, Millburn Mills, Inc, 97-25; A Gallinger, American Velvet Co, 107-26; C Wood, American Velvet Co, 103-26; M Gurley, American Textile Co, 126-36; F Deitrick, Powdrell & Alexander, 98-30; R Farrell, Stein Hall & Co, 116-30; H Sherman, Providence D B & C Co, 107-35.

Also, S Sladon, Providence D B & C Co, 136-40; L Vavala, Providence D B & C Co, 124-35; John Roarke, Lincoln Bleachery & Dye Works, 112-39; James C Shore, Atlantic Chemical Co, 113-39; G Gantz, Lincoln Bleachery & Dye Works, 100-39; L Rossiter, Nopco Chemical Co, 99-26; W D Cul'en, Carbic Color & Chemical Co, 101-30; Charles Stokes, Carbic Color & Chemical Co, 93-27; H Petelle, Interchemical Corp, 106-40; L Graichen, Allied Textile Printers, 103-40; E Councell, Interchemical Corp, 132-40; J Quinn, Southbridge, 107-40.

Philadelphia Section———

FINISHING OF WOVEN COTTON FABRICS*

RAYMOND H DRUKKER

American Cyanamid Company
Textile Resin Department

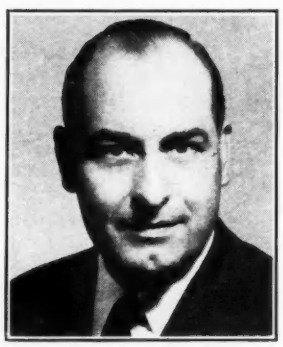
The general principles of fabric finishing are developed historically and logically by the author, where "finishing" means the later steps in textile processing in which the fabric with its final color is changed in hand, weight, appearance and other physical properties. Mercerization, starch finishing, softening, loading and calendering as finishing methods are described. Calendering is especially fully developed, and the process of Sanforizing is made clear. Water-repellency and fire retardency are discussed. The use of various thermosetting and thermoplastic resins in attaining modern durable finishing effects is explained.

PURPOSE

IT IS the purpose of this paper to present in a concise manner the various materials and methods in use today for "dressing up" cotton fabrics to make them more pleasing to the consuming public. This altering or "finishing" of cotton fabrics has two main objectives: the first is to improve the feel, or hand as the finisher calls it; the second is to improve the usefulness. However, in many cases the two objectives are interlocked.

The first steps in the preparation of a cotton fabric, namely, singeing, desizing, boiling, bleaching and dyeing, are not normally termed finishing and will not be considered in this discussion.

MERCERIZATION—There is one process however, which can be considered as a permanent finish. This is mercerizing, as developed in its earliest stages by John Mercer about 1850. I have no actual figures, but I judge that about 50% of all fine cotton fabrics are mercerized. The process can be applied to either yarn or woven fabrics. The process in its simplest form is practiced as follows: saturate the cotton with a caustic soda (sodium hydroxide) solution at about 50° Tw. Squeeze off excess caustic and then maintain fabric in a taut condition for a short length of time, usually about one half to one minute. Then wash out the caustic solution while the fabric is still held tight. The caustic is washed out first with hot-water and then with cold-water sprays and later with wash boxes and squeeze rolls. There are two different types of machines for performing this operation. The first is the usual type, which consists of a padder or series of padders followed by a clip tenter for holding the fabric tight. This tension is developed both warp and filling wise because of the shrinking action of the caustic. What is actually taking place is a change in the appearance of the cotton fiber, from a fiber that looks like a piece of copper tubing that is flattened and twisted, to one that is smooth and round with only a small hole running through the center of the fiber, just as though a copper tube had assumed its normal shape but the wall thickness had increased so that the hole through the tube were almost closed. This takes place as the fabric moves along the tenter frame. After it has progressed about half way, sprays are played on the fabric, washing out a considerable amount of caustic, and the tension relaxes. If the caustic is not thoroughly washed out before the fabric leaves the tenter, serious losses in width and length can develop. The fabric is then given a further wash through an open-width washer. The cloth must then be soured, or treated with weak sulfuric acid, and thoroughly washed again before being dried for dyeing or before being bleached, as the case may be. The second type of machine used for mercerizing is often called a Swiss mercerizer. This is essentially the same as the tenter mercerizer with the exception that the holding-out operation is effected by the use of curved rotating expander bars instead of a chain tenter. The purpose of this finish is twofold: first, to produce a durable luster and, second, to make the fabric more susceptible to dyes, particularly vat dyes, which are expensive. Vat dyes on mercerized fabrics produce a much more solid appearance and, most important, savings of from 25 to 30% are effected in dyestuff. The saving in dye, except in very light shades, more than pays for mercerizing. The degree of mercerization for control work can be easily checked by the barium activity number, an analytical figure determined by a test described in the AATCC monograph, *Analytical Methods for a Textile Laboratory*. If one rule is followed, the test can be used with remarkable repetitive accuracy. This rule is to measure the time that the fabric soaks always to the exact second before beginning titration.



Raymond H. Drukker

STARCH FINISHING

Now, after cloth has received all initial treatments, it is dried prior to finishing. The finishes are almost universally applied to dry fabric. This provides a more uniform finish and affords more careful control. Starch finishes are usually applied on a starch mangle or padder, which is actually a set of two squeeze rolls over a trough to hold the finishing solution. The starch mangle usually consists of a rock-maple top roll and a bottom roll of copper, brass, stainless steel or one having a chrome-plated surface. In general, the pressure between the two rolls is applied by a lever-and-weight arrangement. This is very satisfactory as the swinging weights keep the pressure equalized on both hubs. The padder is usually made of rubber rolls, and the pressure between the rolls is adjusted by lever-set, spring-set, or hydraulic pressure. The hydraulic-pressure padder is very satisfactory, and, like the weight-and-lever system, it adjusts the pressure equally on both axels. The fabric is saturated with starch by two general methods. The first method is called dip and nip. In this method the fabric dips into the starch solution passing under a submerged roll and then through the nip of the squeeze rolls. The second method is often called nip only. In this case, the bottom roll of the starch mangle, or padder, dips into the solution to be applied to the cloth and by rotation draws the cloth through the nip and at the same time furnishes the starch solution to the fabric. This latter type is particu-

* Presented at the Meeting-in-Miniature, October 28, 1950.

larly satisfactory for light-weight fabrics traveling at a high rate of speed. Normal speeds for this type of impregnation are from 50 to 150 yards per minute. After application of the finishing material, the cloth can be led directly to the clip tenter, sometimes with an intervening set of cans to help increase the drying speed. Or the cloth is placed instead into a box and then taken to the drying frames. In this way one starch mangle running at high speed can take care of the production of several frames. In a few processes it is better to operate drying frames at a lower speed than the padder. After being dried, the fabrics are ready for calendering or packing. Calendering will be discussed later.

Starches are generally applied to produce stiffness, to increase weight, to improve sewing qualities or to make a fabric more adaptable to subsequent calendering operations. The main starches used are corn, wheat, tapioca and potato. Corn is the cheapest and produces the dryest hand in the finished fabric. Tapioca and potato are quite alike in tackiness. Both produce a very adhesive solution and a tougher film when spread on a watch glass and allowed to dry. Examination of such a dried film constitutes an excellent test for color and for toughness of film as a measure of the effect expected on a fabric.

It is very important to know about the viscosities of boiled starch solutions as the same mangle will deposit a greater amount of a heavy-viscosity starch solution on a fabric than a fluid starch. Potato starch produces the greatest change in this respect, becoming very thick after a short boil and later thinning down. Corn starch continues to increase in viscosity during a 20- to 25-minute boiling. Tapioca increases slightly on prolonged boiling, and wheat starch changes least of all. Although it may not always be possible under actual production conditions to boil starch an exact length of time, it is a good thing to check boiling time if finishes are varying in stiffness. Long standing after boiling also causes viscosity changes. These changes in viscosity cause variation in the finish obtained. Starches are quite cheap, and for coarser work or where increase in body is needed, they produce excellent quality. However, for two very definite cases the thick-boiling starches fail. When really high concentrations of starch are necessary for very stiff fabrics, the starch becomes too thick and will not flow through the pipes from the tanks and do not pad well on the cloth. Very viscous starches also fray light-weight fabrics. For such fabrics the starch manufacturers can supply converted, or thin-boiling, starches. These are usually listed as of various fluidities with 10 for the heaviest and 90 for the least viscous when boiled. The films produced by these starches, instead of being tough and rather opaque, are usually glass-like and brittle. This glass-like brittle film is useful in producing the transparent effects so greatly desired on fine organdies and dimities. These resilient finishes are often called swung finishes because they are dried on a swing frame. The swing frame is mounted in such a way that the chains on the frame move back and forth at the same time as the fabric advances on the frame. This gives the same effect as if the fabric were grasped at opposite selvedges and then one hand were moved up and down while the other were held stationery. This keeps the warp and filling threads from being glued together at their crossing.

SOFTNESS——Quite in the opposite direction, a fabric might require softness rather than stiffness. For this the finisher usually uses sulfonated tallow or sulfonated oil, the oil being usually olive when procurable, castor, teaseed or others. The new cation-active softeners are better because they never cause bad odors from having turned rancid. They have the further advantage of not turning brown with heat. Although they produce good fullness on equal money value, they do not lubricate sufficiently for cutting and sewing and must therefore most always be used in conjunction with a small amount of a lubricant, such as a sulfonated oil or a wax emulsion.

COMBINATION FINISHES——Starches or softeners when used properly are rarely used alone. Although this appears as though starches and softeners were working against each other, this is not true. Each ingredient fills a definite need in the finisher's formula. I recall one instance of a fabric with no finish in it at all. Also another similar fabric finished with starch alone. These fabrics were sent to a handkerchief manufacturer. He put a hemstitched hem around the four sides to make a handkerchief. The hems fell off at the lightest touch. The fabric was strong because, as soon as it was finished with a lubricant such as sulfonated oil or emulsified wax, the sewing needle slid through the threads and fibers rather than cutting them and the hem was firmly attached to the body of the handkerchief. Likewise, lubrication is necessary to eliminate heating of the cutter's knives with subsequent dulling. In high-speed sewing, sewing machine needles heat up and burn the thread. This causes many breakdowns and therefore loss of production.

The Research and Development Division of the Phila Quartermaster Depot realizes the importance of this feature and is making a careful scientific study of the problem. The results will be fabrics that sew better, garments that last longer and seams that look new and not frayed after several washes. The Division is able to explain how to obtain sewable fabrics and can predict the best performers.

LOADING

There has always been a cry for a certain fabric, such as sheetings and cambrics, to mention a few specifically, that would feel heavier than the same fabric finished by a competitor. The finisher that could make a 68x72, 4.75-yard print cloth look like an 80x80, 4.00-yard fabric got top booking. Heavy combination starch-softener finishes were first used. These finishes were still applied like starch finishes, but loading ingredients were put into the formulas. One class of loaders contains hygroscopic materials, such as glucose and glycerine, or deliquescent metallic-salt chlorides, chiefly of calcium, magnesium and zinc. None of these are too widely used. Glucose affects dyes and changes shades, chlorides tend to break down and cause tendering, and glycerine is somewhat expensive for cotton finishing. There is one combination, however, usually sold as a weighting finish that works well: calcium chloride and starch boiled together and then cooled forms a material that looks like a cloudy white jelly. This produces good weighting without affecting tensile strength to any great extent. These materials add weight because of moisture absorbed from the air. Naturally, on a very dry day they feel different than on a very moist day. Some finishes with large amounts of hygroscopic agents feel clammy on very moist days. Other materials used are urea, Epsom salts and Glauber's salt. These add body without much serious effect except in the case of Epsom salts, which salt out sulfonated softeners. These loaders produce a harsh dry hand, which must be softened.

The next group is that of the inert fillers. These add both weight and opacity. The most important ones are China clay, talc clay, talc and titanium dioxide. China clay, a hydrated aluminum silicate called also kaolin, gives the best filling and loading at the lowest cost. Talc, a magnesium silicate, gives good loading with a nice smooth feel. Talc clay, a special form of magnesium silicate about intermediate between talc and clay, gives an intermediate effect. Titanium dioxide is too expensive for general use, but its exceptional whiteness is very helpful in a mix to help produce good whites.

With all these materials on hand, the finisher does a good job of making a 68x72 look like an 80x80. But merchants still are not satisfied. They now want a 56x52 to look like an 80 square. Well, the answer is that instrument of the devil, the backfilling machine. The most widely used machine is the Tommy Dodd. I guess Tommy Dodd was the inventor, although I have

never been able to get an accurate answer to this question. He must have worked for a finishing-material supplier for they receive the greatest benefits from the invention. The finisher receives plenty of headaches. The ultimate consumer is sadly disappointed if she washes a back-filled fabric, and the merchant must satisfy plenty of claims. However, the merchant usually exports this merchandise so that he seldom hears any more about it. Backfilling is not all farce however, and in many cases where a fabric will never be washed, it proves very satisfactory, for example, for bookcover fabrics and for fabrics that are coated or aftertreated with varnishes or plastic coatings, such as tag cloths or hollands for window shades.

To go back a little, the main reason for the back filling machine was to put starch on fabric so that the holes between the threads were closed up and yet one side of the fabric would still look like a cotton fabric and not look like starch. Although a fabric is often backfilled on both sides, the same effect as backfilling on both sides can also be attained by using a padder with one milled roll to allow a greater amount of starch mixture to be deposited on the cloth than would be possible with a smooth-roll padder.

With all this information on hand it is now time to build a formula. This is far from scientific, but, once started, you build logically and keep accurate records of successes and failures with swatches for future reference. You have a pretty good idea of what the formula should be from past experience or from checking old formulas in text books, but your available materials are not the same, so here goes:

Put in some corn starch because it is cheap. Then add a tallow softener to keep the finish from getting too stiff and to add bulk. Now you must add a filler, so you use China Clay because it fills best and is cheap. Some talc must go in to give that smooth feel, and just a touch of titanium dioxide for a good white color. As the whole thing must be effectively stuck together, you use some adhesive starch like tapioca or potato. Lastly, you add some sulfonated oil to make the mixture flow easily and some tint to improve the color. Boil the mix for a specific length of time and check viscosity and appearance. Put some on a cloth, make adjustments and then make a full-scale run. Now make adjustments on the plant-scale runs, drawing on your knowledge of what each ingredient does to the mix and what each individual customer desires. As far as possible, make only one change at a time and develop formulas slowly but logically.

CALENDERING

When clothes are washed at home they must be ironed. Of course cloth dried on a tenter frame is stretched out flatter than fabric dried on the clothes line, but most of it must still be ironed, or calendered as it is called in textile finishing. A plain calender is similar to a padder and consists of two or more rotating rolls, or bowls. They usually alternate steel bowls with bowls of cotton, paper or husk. Sometimes steel rolls are heated with steam or gas for added efficiency. Pressure between rolls is adjusted by spring, screw, lever or hydraulic set. Bowls are manufactured in a very interesting manner. Disks of cotton, paper or husk, as the case may be, are dropped over an axle against a hub of about equal diameter. Numerous disks are put on the axle and compressed with great pressure until a roll of proper density and length is produced. Then a second metal hub is put on the top and secured in place. This is then put on a lathe and turned down until a smooth surface is obtained.

A cold calender produces smoothness and some surface luster; a heated calender produces greater luster and smoothness. Here again, the finish in the fabric helps in producing the desired final appearance. Pure cotton does not calender well and does not hold its luster.

CHASE CALENDER——Where a silky deep-seated luster is required, as on fine broadcloth, a chase calender is used. This is the same as a plain calender but threaded in such a way that several laps of cloth pass through nips at one time. This has the effect of keeping the threads of the cloth round and polishing the entire surface of the threads rather than flattening the fabric and polishing the top.

SCHREINER CALENDER——This is usually a two-bowl calender with hydraulic pressure between the bowls. The top roll is of gas-heated steel engraved with 200 to 300 fine lines per inch running about 15° to the horizontal. These lines cut into the fabric and produce a silky finish. This type of calender is generally used on sateens and twills.

EMBOSSING CALENDER——A modification of the Schreiner calender is the embossing calender. This presses various patterns into the fabric.

FRICTION CALENDER——This calender usually has three bowls. The top and bottom rolls are geared so that the top metal roll travels about two to four times as fast as the center roll. This top roll, because of its pressing and rubbing action, produces a very highly polished surface associated with glazed chintz.

DAMPENING——Some finishes, particularly Schreiner and friction finishes, require dampening before calendering. This makes the finish plastic and ready to be smoothed by the calender. The heat of the calender then dries out the finishing material and sets it.

BREAKING——Calendering often makes a finish too firm. A button breaker or scroll breaker is then used to agitate the fabric and to break loose the finish that has cemented the thread crossings together.

PALMER CALENDERING——A Palmer calender is essentially a large steam-heated cylinder. Against this heated cylinder is pressed an endless woolen blanket about a half inch thick. Dampened fabric then moves along between the woolen blanket and the heated cylinder or drying drum.

SANFORIZING——By placing electric shoes or heated irons on the ingoing roll of the Palmer blanket and controlling the diameter of the entering roll and the curvature of the drying cylinder, one of the great improvements in cotton finishing was developed, namely, Sanforizing, or shrinkage control. By Sanforization, shrinkage is controlled to 1% in both warp and filling when the fabric is washed at the boil. Very little progression in shrinkage takes place after the initial wash as cotton is not susceptible to felting.

DURABLE FINISHES

The pendulum has swung the other way today, and there has been greater demand for more durable finishes. As cotton fabrics are mainly used in washable items, merchants are requiring finishes that last longer through repeated washings. The more prominent ones are as follows:

HABERLEIN, OR ACID FINISH——This method produces very fine finishes from transparent organdy to soft wooly handkerchief finishes. These excellent finishes are produced by alternate baths of caustic soda and 52° Tw sulfuric acid. This finish was developed in Switzerland but is practiced today in a few bleacheries. Its use has been limited because of the destructive nature of the sulfuric acid and the careful control necessary. They offer some control of shrinkage under certain conditions.

ETHYLCELLULOSE FINISH——A durable finish is produced by the use of cellulose dissolved in caustic. About 8% cellulose is dissolved in 10% caustic soda solution. This produces a clear viscose solution. This material is padded on the cotton cloth. In some cases this cloth is then dried on a tenter frame and then insolubilized or coagulated with 5% sulfuric

acid. Sometimes the fabric while still wet from padding is run directly into a 5% acid bath. Sometimes the solution is coagulated by feeding the fabric directly into the mercerizing machine as strong caustic soda solutions as well as sulfuric acid can be used for coagulation. After coagulation, the acid or caustic is washed out thoroughly. The fabric is then extracted and dried. This produces a heavy, firm, durable finish.

THERMOPLASTIC-RESIN FINISHES—Recently emulsions of thermoplastic resins have been widely used to produce durable finishes on cotton. The most common resins used for this purpose are vinyl acetate, alkyd, urea-formaldehyde, melamine-formaldehyde, acrylate and other resins. These emulsions are simply mixed with water, starch solutions or solutions of selected softeners at normal room temperature. The solution is then padded on the cloth and dried. If well dried, the emulsifying agents or solvents used in the emulsifying process are driven off. When these are driven off, a very durable finish is produced. Thermoplastic means that the resin becomes plastic or softened with heat. If allowed to cool, the resin stiffens again. This feature helps in running very stiff finishes. While the cloth is still warm, it comes off the tenter frame in a pliable condition rather than firm as a starch finish does. This helps to produce rolls of cloth that are easier to work with. These resins help to produce finishes that calender well without dampening. They do not have crease-resistant or shrinkage-control properties but have little effect on the shade or fastness properties of dyed fabrics.

WATER-REPELLENT FINISHES—These are divided into two groups, durable and nondurable. Water-repellent finishes are those that repel water without becoming wet. They are not waterproof or impervious to the passage of moisture through the fabric as coated fabrics would be. It is also important to note that a water-repellent finish must not change the physical appearance or hand of a fabric.

Originally, finishers first impregnated the fabric with a soap and then precipitated the soap in the material by treatment in a second bath of aluminum acetate or other salt to get a water-repellent effect. This procedure was clumsy from the finisher's standpoint, and the results were usually not very uniform. Since that time, many types of wax emulsions containing aluminum acetate or formate with added zirconium salt have been prepared by various chemical manufacturers. These are mixed with water at various temperatures according to the product. This solution is padded on the cloth and dried. The finish is very satisfactory in making the fabric water repellent but is quickly and easily removed by washing or dry cleaning. In order to overcome this difficulty, two classes of durable water repellents were invented. One type is an organic pyridine compound and the other a resin-base compound. Both of these are fast to repeated washing and dry cleaning, provided all soaps or solvents are removed from the fabric. At times, a dry cleaner will leave solvent or wetting agent in the material. This detracts from the water repellency, but the goods will be water repellent again after being carefully rinsed. Considerable work has been done recently with the people that make dry-cleaning solutions to produce a disappearing type of dry cleaner's soap that will be completely removed in drying. Both types of materials are prepared according to instructions of the manufacturer. Both solutions are safe to use and normal equipment can be used for padding. The prepared mixtures are padded on the cloth, a three-bowl padder being superior to a two-bowl. After being padded, the pyridine type must be dried first at one temperature and then cured at about 325°F. After the curing, the fabric is washed and then dried again. The resin-type material is either dried and cured in one or two operations, but it must be cured at temperatures above 290°F. The resin type of product can be mixed with thermosetting resins to produce a finish that is both durably crease resistant and durably water repellent in one operation.

FIRE-RETARDENT FINISHES

Fire-retardent finishes can be divided into two classes, durable and nondurable. These finishes are a complete study in themselves. The purpose is to produce a finish that will not support combustion and will not flame when a flame is applied to the fabric. Also, the fabric must not continue to glow after the flame has been removed. Many combinations are used for this purpose, including borax and boric acid, ammonium sulfate, ammonium sulfamate, ammonium phosphate, and many others. While these finishes are not durable to washing, the main difficulty is the fact that on storage they pick up moisture and the resultant acids cause tendering. New durable finishes are being developed for this purpose and have great possibilities, although I consider them all still in the process of development. The first type is an antimony-titanium-salt combination dissolved in 18% hydrochloric acid. This is padded on the cloth and then precipitated with soda ash. As the strong solution of acid is very destructive, special equipment is necessary for putting this solution on the fabric. Also, frequently, a chalky appearance is imparted to the fabric. The fire retardency and durability, however, are good. Another type of durable fire retardent is produced with a specially compounded vinyl chloride. I have had no experience with this finish. A third type being used is a nitrogen-phosphorus-base fire retardent, which is fast to mild washing and dry cleaning. This is applied as follows: pad, dry, cure at temperatures above 325°F, wash and dry again.

THERMOSETTING RESINS

Thermosetting resins are those that can be applied to a piece of fabric as a colloid or solution. After being dried at proper temperatures, they become set and then remain in that condition. In this respect they resemble concrete which, once dried, can never be reshaped. The most important resins for this purpose are urea-formaldehyde and melamine-formaldehyde. In cotton work, melamine-formaldehyde has found much greater acceptance than the urea type because it has less effect on tensile strength, less chlorine retention and greater durability and greater uniformity of resultant finish.

One widely used finish is applied by the Everglaze process. This consists chiefly of padding a solution of melamine-formaldehyde resin on the fabric and drying in such a manner as to retain about 10 to 15% of moisture in the fabric. While the resin is still in this plastic, or malleable, state, various effects are imparted to the fabric by use of a calender. The friction calender produces the familiar glazed chintz. Other finishes can also be applied, such as the Schreiner or Chase finish. In the last two years, the embossing calender was used in this process to make ordinary plain sheeting look like a birdseye, waffle, piqué, or Jacquard. After these patterns are impressed on the cloth, they are cured at temperatures between 290 and 330°F. After being cured, the fabrics are washed in open width and dried again, ready for the ultimate consumer.

Melamine-formaldehyde has been widely used in the last two years to produse crease-resistant finishes on cotton. These finishes, when used properly, help to reduce residual shrinkage. Shrinkages of less than 2% can be produced when tested by Sanforize wash tests. The melamine-resin solution is padded on the cloth and dried. It is then cured at about 300°F. However, drying and curing can be accomplished in one operation if necessary. After being cured, the fabric should be slack washed and dried. Special buffers have been used to control the odor and increase the strength of treated fabrics. Also, patents

(Concluded on Page P714)

THE AATCC DYNAMIC DIMENSIONAL CHANGE METER—MEASUREMENT OF SHRINKAGE AND ELONGATION OF WOVEN FABRICS*

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The Dynamic Dimensional Change Meter is a simple, convenient instrument for studying dimensional changes in a captive specimen of fabric. The fabric may be subjected to any desired conditions of immersion or spray wetting, drying, temperature, or various degrees of relative humidity without removal from the instrument. It was conceived and developed in the AATCC Laboratories in 1947* to provide a versatile and convenient method for studying dimensional changes as they occur.

Interesting results have been obtained in these laboratories and it is believed the device should be useful in studying the relation of structure, yarn twist, mixed fiber content and finish to shrinkage and elongation. It may provide information concerning the optimum point at which tension should be applied most effectively in relation to critical moisture content of the fabric.

An early model of the Meter was loaned to the Intersectional Contest Committee of the New York Section as a basis for developing information, particularly on rayon. An excellent paper was presented by this Committee and the findings and data were published in the AMERICAN DYESTUFF REPORTER.

The instrument is not an AATCC standard. It has been submitted to the Committee on Dimensional Changes of Fabrics for investigation.———H W Stiegler.

THE determination of dimensional stability of fabrics has long been of major interest not only throughout the textile industry but also in garment manufacturing and in the dry cleaning industry to obtain fabrics with minimum shrinkage in consumer use. Test methods previously employed were generally more restricted in scope and as a rule were directed only to the endpoint or final shrinkage. No opportunity was offered to study changes, rate of change and critical periods of change. All of these are conceivably related to type of fiber or mixtures of fibers, fabric construction and finishing conditions.

The AATCC Dynamic Dimensional Change Meter has been found *(1)* to overcome to a considerable degree most of these deficiencies. A high degree of reproducibility of test results between laboratories using this test instrument has been demonstrated on woven rayon fabrics and the results have been correlated with those obtained in various currently-used test procedures and in both home and commercial laundering.

Further investigation has been made of various factors that may influence the dimensional stability of woven textile fabrics. Studies have been made of low and high temperature drying, effect of wetting agents, humidity, moisture content of the fabric during drying, and dimensional restorability by the application of tension.

DESCRIPTION OF THE AATCC DYNAMIC DIMENSIONAL CHANGE METER

The AATCC Dynamic Dimensional

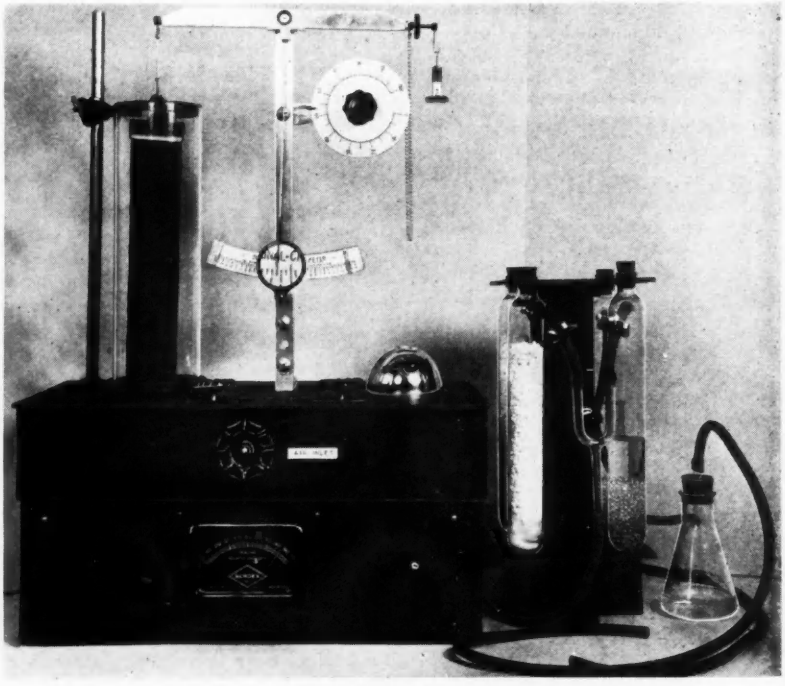


Figure 1
AATCC Dynamic Dimensional Change Meter

* During shrinkage studies carried out on the Tension Presser under the sponsorship of an American Viscose Company Fellowship, held successively by Rita Landry and James O'Flahaven, a preliminary investigation was made of an early prototype. Development of the instrument was carried out by the AATCC staff.

Change Meter (Figure 1) consists of a Pyrex cylinder in which the test strip is held in a vertical position between two clamps, the lower clamp stationary, and the upper one suspended from one end of a balance arm. Varying amounts of tension may be applied to the other end of the balance arm by means of a chainomatic device, by the application of a desired load to a small pan, or by the use of a rider sliding along the balance arm. The arm is pivoted on a ball-bearing mechanism and has affixed to it a pointed indicator which operates over a scale graduated in percentage dimensional change (shrinkage or stretch).

A system of tubes and valves is connected to the bottom of the Pyrex cylinder, thereby permitting the filling and emptying of the cylinder with liquids, the passage of hot or cold air from a blower, the introduction of steam, or the admission to the cylinder of a fog or mist by means of a nebulizer. Air at any desired humidity may be used. The moisture content of the humidified air is controlled by merging streams of wet and dry air. Valves regulate the flow of compressed air through two sets of towers, one containing calcium chloride to dry the air to 0% R H, and the other containing glass beads and water, which wets the air to 90% R H. Thus the flow of air from the towers may be regulated to obtain any desired humidity level between 0 and 90%. The percentage relative humidity of the air passing into the Pyrex cylinder may be determined at any time by a direct reading of the humidity meter enclosed in the base of the apparatus.

It should be noted that this apparatus permits the continuous measurement of dimensional changes taking place in a woven fabric during wetting and during drying without the variations encountered when the fabric is tested by other methods, which involve handling of the fabric during or between operations. Tensions usually involved in the pressing of the fabric may be eliminated or precisely controlled. Since mechanical action encountered during laundering or compression of the fibers during pressing is absent in the present method, the separation of relaxation shrinkage without tension from compressional or felting shrinkage becomes possible.

TEST PROCEDURE

Test fabrics are normally conditioned at 65% R H — 70°F to avoid including any dimensional change due to differences in the initial moisture content. From the warp or filling directions of fabrics being studied test strips are cut exactly 10½ inches in length and 2 inches in width and accurately marked 10 inches in the longer direction to allow ¼ inch at each end for insertion between the clamp jaws. Each end of the test strip is securely fastened in a clamp precisely at the inner edge of the marks and the assembly is mounted in a vertical position in the Pyrex cylinder.

The strip may be balanced with no tension (by means of the chainomatic device and positioning of the percentage scale so that the pointer rests at zero) or under tension, if desired (by means of weights added to a pan at the opposite end of the balance arm or by use of a rider on the balance arm). Additional load may be applied manually throughout a time cycle by the same means.

After the water outlet and air inlet valves are closed, the water inlet valve is opened and the cylinder is allowed to fill with water or other liquid, after which it is then closed. Any dimensional change occurring during the wetting cycle may be noted by the position of the pointer on the scale. The water is drained from the cylinder by opening the water outlet valve. The air inlet valve is opened and the test strip is dried under the desired conditions of tension, air temperature, or humidity. The changes in dimension occurring throughout the drying cycle may be observed and dimensional change/time cycle curves may be plotted to determine the effect of the imposed conditions.

Studies may be made of the effect of air at various relative humidities by eliminating the wetting cycle and exposing the conditioned test strip to air at the desired humidity level.

EFFECT OF WETTING

Water at any desired temperature may be used to wet the test strip. Other liquids, i e, solutions of salts, surface-active materials, dry-cleaning solvents, etc, may be employed to study their effect on dimensional change. With water at 90°F many wool, cotton, or rayon fabrics exhibit a rapid change during the first minute of wetting with little further change during succeeding minutes of a wetting cycle. Occasionally the warp or filling of a fabric will show a slight change after the first minute of wetting, and a wetting cycle of at least ten minutes is to be preferred in most cases.

Wetting agents investigated so far have had little effect on dimensional change occurring during wetting with water at 90°F and subsequent drying, and their practicability for use in wetting the test strip is not indicated since the effect may be regarded as insignificant.

EFFECT OF DRYING

Figure 2 illustrates the effect of the temperature of the air used to dry the test strip on dimensional change of a wool

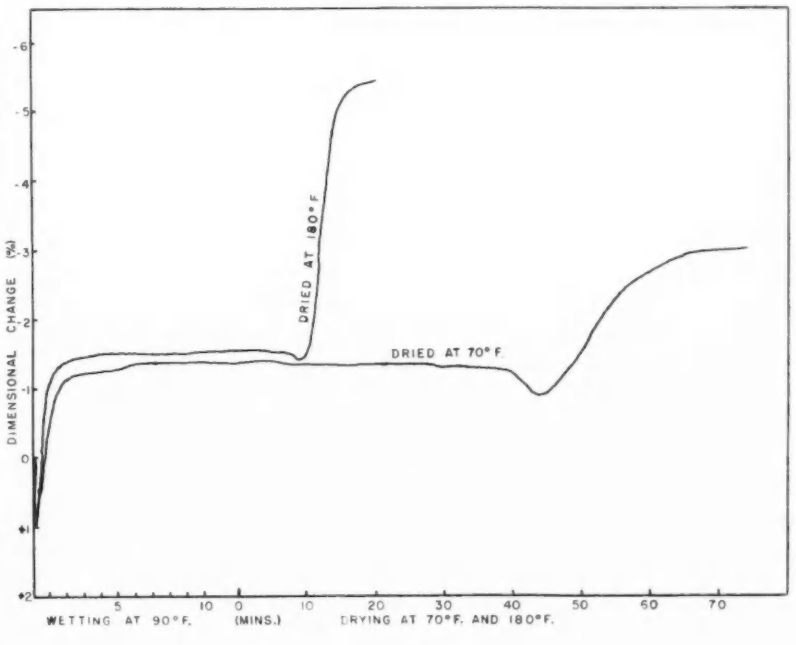


Figure 2
Effect of Drying Temperature On Shrinkage of a Wool Gabardine

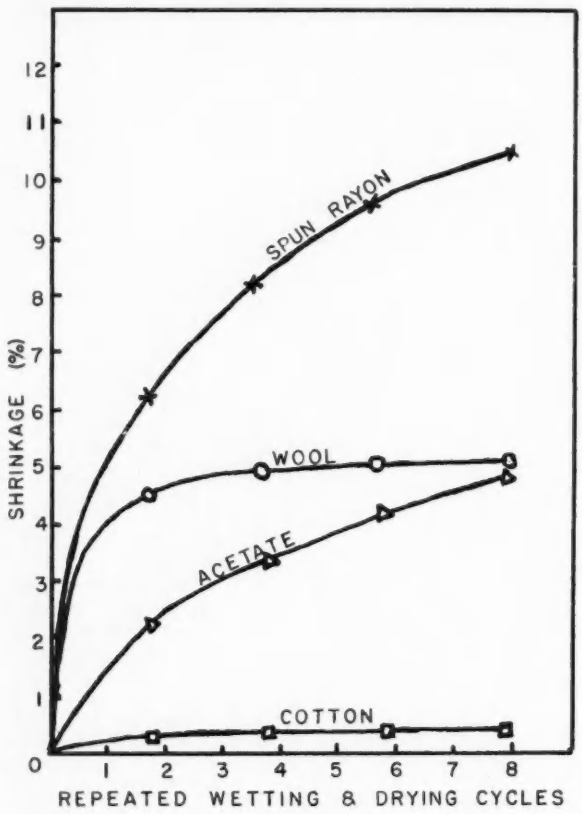


Figure 3
Shrinkage of Various Fabrics on Repeated Wetting and Drying, Illustrating Degree of Stability.

X—Spun Rayon Poplin (Unstable)
O—Wool Flannel
Δ—Acetate Ninon
□—Cotton Broadcloth (Stable)

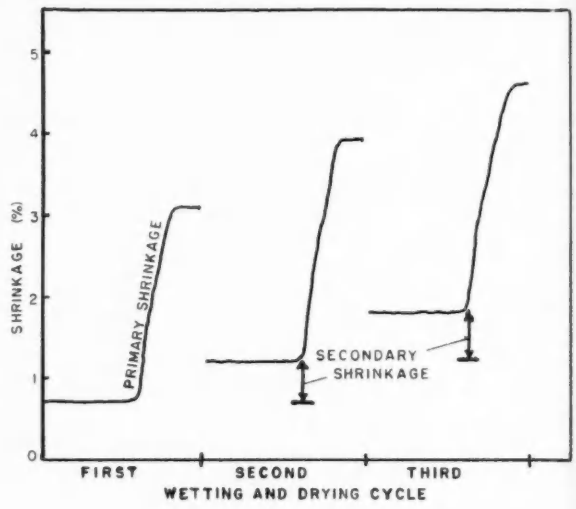


Figure 4
Progressive Shrinkage in an Acetate Taffeta Warp during Repeated Wetting and Drying Cycles

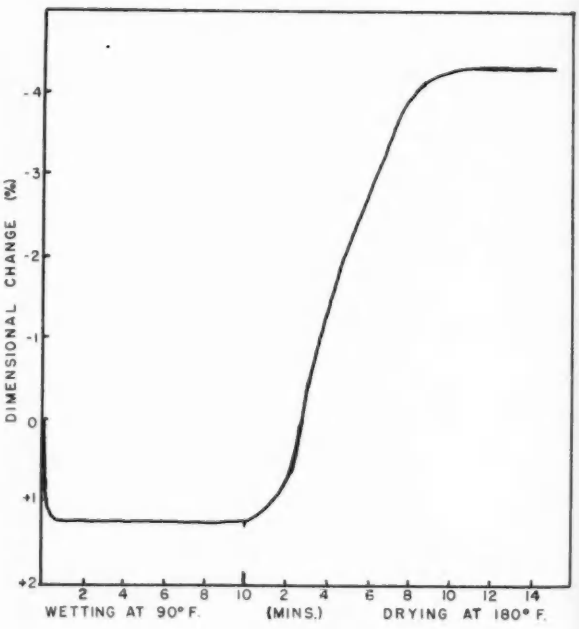


Figure 5A
Effect of Wetting and Drying on Dimensional Change of a Tropical Worsted Fabric Warp

gabardine. The total shrinkage occurring at 70°F is, in this instance, approximately one-half that obtained at 180°F. The slower evaporation rate at 70°F results in an increased time of drying. It will be noted that the two dimensional change curves exhibit the same characteristics with regard to the slight dip in the curves, i e, stretch of the fabrics.

Figure 3 illustrates typical shrinkage occurring in various fabrics on *repeated* wetting and drying and the considera'le differences in dimensional stability which may exist in fabrics of different fibers and construction.

Most fabrics, on repeated wetting and drying, show two types of shrinkage. A primary shrinkage occurs on wetting and drying the fabric. When rewet the fabric elongates almost to its original wet length and the primary shrinkage reoccurs when the fabric is dried again. A secondary shrinkage, i e, the difference between the original wetting and drying shrinkage and the subsequent wetting and drying shrinkage occurs during repeated cycles. This progressive or secondary shrinkage takes place due to the gradual release of strain set in the fabric during finishing and is nonreversible except when tension is applied to restore the fabric to its original dimension.

Figure 4 shows the primary shrinkage obtained on an acetate taffeta warp during each wetting and drying cycle as well as the secondary shrinkage occurring between the original wetting and drying cycle and subsequent wetting and drying cycles.

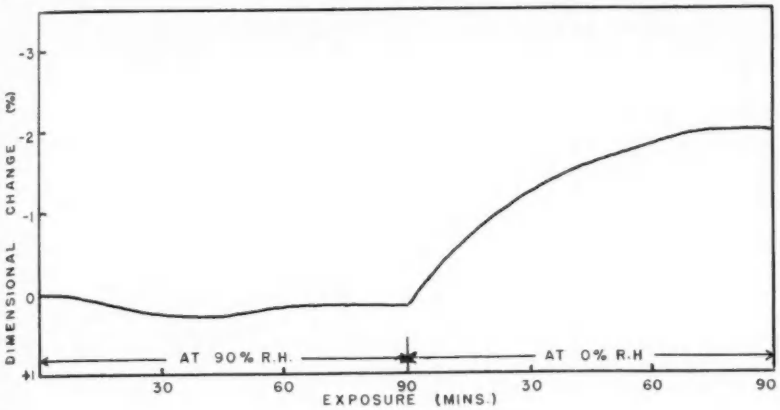


Figure 5B
Effect of Exposure to High and Low Humidity on the Dimensional Change of a Tropical Worsted Warp

EFFECT OF HUMIDITY

The AATCC Dynamic Dimensional Change Meter may be used to determine the effect of changes in relative humidity on the fabric without tension or at various load levels. This permits a study of dimensional changes occurring in fabrics not only during mill processing but throughout the individual steps in tailoring a garment. It has been found *(2)* that the fabric generally stretches as the humidity increases, particularly around 90% R H, and shrinks when the fabric is exposed to dry air. These changes in dimensions may be studied and correlated with fabric structure to allow the design of dimensionally stable fabrics.

Figure 5A shows the dimensional change of a tropical worsted warp on wetting at 90°F and drying at 180°F without tension. Figure 5B illustrates the stretch and shrinkage taking place when this fabric is exposed, without tension, to air at high and low relative humidities. The fabric was previously conditioned at 65% R H and 70°F before testing and only slight stretch occurred in this instance on exposure of the fabric to air at 90% R H. However, considerable shrinkage is obtained when this same strip is subsequently exposed without tension to dry air at 0% R H. The total dimensional change between 0 and 90% R H is 2.3% as compared with the total dimensional change of 5.5%, which occurs on wetting by immersion and drying.

A study of the dimensional changes occurring when various tensions are applied to the test strip during exposure to wet and dry air would permit anticipation of the changes which would take place on relaxation of the stretch set in the fabric during pressing of a garment. These data would serve as indications of changes in dimension and garment appearance in subsequent consumer use.

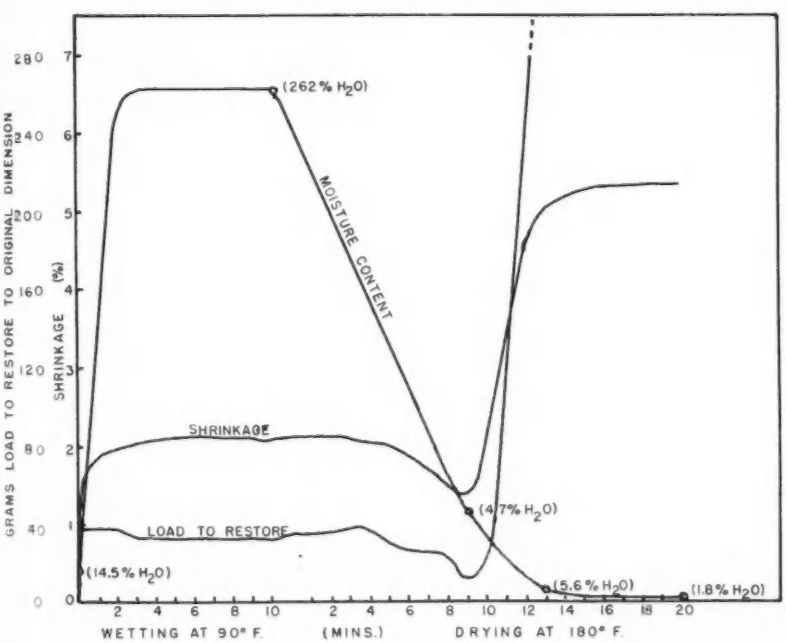


Figure 6
Relation of Warp Shrinkage of a Spun Rayon Butcher Linen to
(a) Its Moisture Content
(b) Load Required to Restore the Warp to Its Original 10 Inch Length During Wetting and Drying

EFFECT OF MOISTURE CONTENT

Since it had been found previously *(2)* that changes in the moisture content of wool fabrics cause dimensional changes in those fabrics, an investigation was carried out to determine the effect of the moisture content of a rayon fabric on the shrinkage of the fabric during wetting and drying.

In Figure 6 is shown the shrinkage that occurs in a spun rayon butcher linen during an immersion wetting period of 10 minutes at 90°F followed by drying without tension for 20 minutes at 180°F. The moisture content of the fabric test strip was determined at the start of the test; after wetting; after drying 9 minutes, at which point the fabric showed a sudden rapid shrinkage; after 13 minutes when the fabric showed no further shrinkage; and after 20 minutes drying time.

It will be noted that this fabric shows a slight extension during the early drying stage. This elongation during drying appears to be neither a function of increasing temperature, since the phenomenon also occurs during low temperature drying (Figure 2), nor of swelling of the viscose fiber, since the same elongation appears during drying after treatment with 4% KOH solution (Figure 7).

The possibility of surface tension of the liquid-fiber and liquid-yarn interface is being investigated since liquid film throughout the fabric might exert an aggregate tension sufficient to hold fibers and yarns together until the film breaks and evaporates. The elongation or dip in the curve always occurs at the critical point when the last of the visible water in the

fabric suddenly vaporizes and the fabric assumes a dry appearance. Immediately after this critical point, rapid shrinkage is recorded and the curve proceeds sharply upward from the dip.

Rapid shrinkage during drying occurs when the moisture content is reduced to aproximately 50 to 60%. (Similar rapid shrinkage was obtained in a spun rayon gabardine in which the moisture content was lowered to 61%.)

TENSION REQUIRED TO MAINTAIN THE ORIGINAL DIMENSION

Figure 6 also demonstrates the tension in grams required to maintain the fabric at its original dimension during wetting for 10 minutes at 0°F and drying for 20 minutes at 180°F. The required tension is relatively low when the moisture content is above approximately 50 per cent. When the critical moisture content is reached, at which point the rate of shrinkage increases rapidly, the tension required to maintain the fabric at its original dimension becomes relatively great, i e, more than twenty times that previously required when the moisture level was high.

Data as shown in Figure 6 should aid in the determination of optimum tensions in textile wetting and drying operations to facilitate the production of fabrics with minimum dimensional change characteristics.

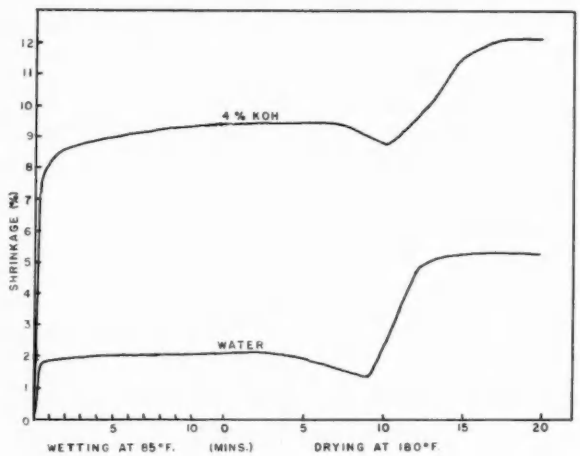


Figure 7
Comparison of Warp Shrinkage of a Spun Rayon Butchers Linen Wet in Water with Fabric Wet in 4% Potassium Hydroxide Solution Before Drying

REFERENCES

(1) New York Section AATCC, "The Strip-Tester—An Instrument Designed to Measure Dimensional Change in Woven Rayon Fabrics", *Am Dyestuff Reptr* 40, P210-217 (April 2, 1951).

(2) von Bergen, Werner & Clutz, C S, "Dimensional Stability of Woolen and Worsted Fabrics", *Textile Research J* 20, 580 (August, 1950).

Finishing of Woven Cotton Fabrics

(Concluded from Page P709)

have been granted on the special blending of methylated and unmethylated melamine resins to produce fabrics of superior strength and crease resistance. A new development in the use of thermosetting resins is the use of an acid colloid of melamine-formaldehyde resin. This is used to produce a durable finish which has shrinkage control or fabric-stabilizing properties without the necessity of curing. This type resin finish has little effect on the tensile strength of a cotton fabric. The colloid is produced by diluting a methylated melamine resin with water and then adding an organic acid. This solution is then aged until a blue color develops. About an hour after the color develops, the colloid can be padded on the fabric and dried at temperatures above 230°F. This material is of great interest on light-weight curtain and dress fabrics.

Although it was difficult to cover this subject in the time allowed, I have tried to hit the high spots. If anyone wishes me to enlarge on any of the finishes discussed, I will try to answer to the best of my knowledge.

LIST OF TEXTILE CHEMICAL SPECIALTIES FOR "1952 TECHNICAL MANUAL AND YEAR BOOK"

To Manufacturers and Importers of
Textile Chemical Specialties

30 Lahey St
New Hyde Park, N Y
Sept 30, 1951

Gentlemen:

The American Association of Textile Chemists and Colorists is again collecting material for a new "Technical Manual and Year Book", namely, for the 1952 edition. According to our new policy with respect to the List of Textile Chemical Specialties, new entries are to be accepted only every alternate year, and the next opportunity for this gratis service is now before you.

All manufacturers and importers of textile chemicals are therefore invited to prepare cards, according to directions on p 262 of the 1951 edition, for

ONLY THE FOLLOWING:

New Entries
Corrections
Deletions

Unnecessary cards, that is, cards for entries that are already correct, will be thrown away. Cards that are not made out in the proper form will be returned for correction. All that is necessary is to follow the style of presentation and the directions of the 1951 List. And please

DO NOT USE ALL CAPITAL LETTERS for names of products.

The deadline for receipt of material for the 1952 List is November 15, 1951.

Yours truly,
Carl Z Draves
For Publications Committee

• PATENT DIGEST •

• Correction

On page 605 of the September 17th issue it was indicated that sodium *nitrite* had no effect in preventing over-reduction of the anthraquinone dihydro azine dyes. This "nitrite" should have correctly been "nitrate."

U S Pat 2,548,544 discloses that inorganic nitrates, organic nitrates and nitrites will not give the improved results of inorganic halogenates. (See *Am Dyestuff Reptr 40, page* 539). In contrast thereto, sodium *nitrite* was found to have a very pronounced effect in preventing over-reduction of the forementioned dyes.

DYEING ACRYLONITRILE POLYMERS with Acetate Dyes———Sulfuric Acid Pretreatment C 4, 07

U S Pat 2,548,853 (American Viscose Corp——Baker——April 17, 1951)

Dyeing acrylonitrile polymer fibers with acetate dyes of the dispersed type has been recommended, but the standard method has not been successful up to now because only shades of insufficient depth and unsatisfactory fastness have been obtained.

The present specification suggests the pretreatment of synthetic fibers containing about 40% acrylonitrile (or another polymerizable nitrile) in aqueous sulfuric acid from 75-80% for a short time (15 seconds to one minute) at room temperature. The acid-treated material is washed free of acid, dried and dyed with a dispersion of a water-insoluble acetate dyestuff. The dye absorption is said to proceed readily to equilibrium.

The reason for this effect is not known but the inventor assumes that the nitrile groups,-CN-, might be transformed by adding water into the radicle,-CO.NH_2, and fixing the cellulose acetate dye to the amido group, and also thereby to the resin fiber. Quite generally this reaction is widely used in organic chemistry to transform aliphatic nitriles into acid amides.

Example: a knitted fabric composed of acrylonitrile-vinyl copolymer fibers (60% vinyl chloride and 40% acrylonitrile) is immersed for one minute in 80% aqueous sulfuric acid at 25° C and washed acid free, after which it is air dried. The fabric is found to be neither stiffened nor shrunk by this treatment. It could be dyed with an alkylsulfate-dispersed dye (2% Celanthrene Red 3B) at boiling temperature to give a level deep shade.

Among other references cited by the Patent Office:

PAUL WENGRAF

USPat 2,431,956 (1947—du Pont): dyeing acrylonitrile fibers by first impregnating the fabrics with naphthol, then immersing them in acid and finally into a solution of a diazotized base. (See *Am Dyestuff Reptr* 37, 247, 1948).

USPat 2,359,735 (1944—Cyanamid): dyeing Vinyon (Vinyl chloride acetate copolymers) with dispersions of oil soluble, water insoluble azo colors containing a phthalate ester e g, diamylphthalate.

For dyeing acrylonitrile polymer fibers with acetate dyes using cresol as an auxiliary agent, see USP 2,512,969 (du Pont) *Am Dyestuff Reptr 39*, 766, 1950.

PIGMENT PRINTING——Pigments Ground with an Oil-Modified Alkyd Resin D, 2, 07

U S Pat 2,550,047 (S A Francolor——Durr, et al——Apr 24, 1951)

Siccative alkyd resins, i e, condensates of glycerol with phthalic anhydride modified with drying oils, have been used for pigment printing; the resins are generally emulsified with water and this emulsion is ground with pigments.

The present method suggests an improvement of this process by first grinding the oil-modified alkyd resin with a pigment in the absence of any dispersing or emulsifying agent. After intensive mechanical working is performed, the pigment is sufficiently dispersed in the resin. This dispersion is further emulsified in water by using water-soluble cellulose derivatives, such as methyl cellulose, oxyethylcellulose or other emulsifying agents of the polyvinylalcohol type, ethylene oxide condensates and so on.

It has been observed that alkyd films that are composed according to this principle remain sufficiently plastic, smooth and homogenous during the subsequent drying operation. Other formulations give films that become spongy and uneven in quick drying.

Example: a printing paste composed of 100 p of an alkyd resin, modified with soy bean oil and dehydrated caster oil, is intimately ground with 10 p Monastral Blue BS. The resulting pigmented resin is gradually introduced into a mixture of 15 p methylcellulose and 5 p triethanolamine in 135 p water. After printing and drying is done at 60-100° C, the final fixation can be effected by passage through a drying chamber (20 minutes at 120° C or 6 minutes at 160° C). Prints that are fast to crocking and hot scouring are obtained.

Among other references cited by the Patent Office:

USP 2,356,794 (1944—Cyanamid): pigment printing with resin emulsions containing a water-insoluble cellulose ether, in addition to the resin (e g, an alkyd resin).

USP 1,998,744 (1935—Du Pont): polyhydric alcohol—polybasic acid condensates of the modified alkyd type for coating purposes are prepared by first using an excess of the acid, then adding the equivalent of polyalcohol plus a volatile base, e g, ammonia.

Ger P 599,211 (1934—I G Farbenindustrie): pigment printing, emulsions prepared by first milling an oil-modified alkyd resin with a pigment and emulsifying this homogenized composition in an aqueous solution of caseinate, borax and ammonia.

DYEING WOOL———Padding with Dyestuff Solutions, Hot Acid Aftertreatment C, 4, 06

U S Pat 2,552,404 (Ciba Ltd——Casty——May 8, 1951)

In contrast to standard wool dyeing processes, the present method suggests the impregnation of animal fibers for a short time, e g, by padding or the like, with a concentrated dyestuff solution to squeeze the goods and to convey them through an acid bath at temperatures above 80° C up to the boil. An aqueous solution of 0.5—30 g H_2SO_4 per liter is recommended but other acids can be used with the same effect, e g, formic acid (combined with sulfuric acid in developing Indigosols).

This method is not restrictd to a special class of dyestuffs. Any dye can be used provided it has some affinity to animal fibers in acid fixing media. Examples include acid dyes (Orange II, Cloth Fast Black B, C I #307), direct dyes (Chlorantine Red 8 BN), Indigosol dyes (e g, the sulfuric acid ester of leuco dimethyl dichloro thioindigo) and some chromatable acid dyes.

In dyeing with an acid dye, the scoured wool material is impregnated at 70° C with a 3% solution of Orange II until the fibers are completely wetted out, an auxiliary of the Ultravone type is optionaly added, the excess liquid is removed and the goods are passed within 4 minutes through a boiling bath containing one g sulfuric acid conc per liter to which an nonionic auxiliary is added. A deep Orange shade results.

This method can be carried out with Indigosol- or direct dyes in an analogous way; acid chrome dyes are preferably impregnated with the dyestuff solution, passed first through the boiling acid as above, squeezed in order to leave some residual acid in the

material and, finally, led through a hot acid chrome bath.

It is interesting to note that this dyeing method avoids any fiber damage caused by a prolongated treatment in hot acid liquids (lasting for one hour or more). A great advantage is attained in the speedy procedure; a continuous wool dyeing process becomes possible permitting the use of resist printing methods. Of course the equipment has to be built in stainless steel that is resistant to the boiling acid solution.

Among other references cited by the Patent Office:

USPat 2,387,200 (1945—Uxbridge Worsted Wool): a method for dyeing woolen textiles in the open width by passing them from 15 seconds to 5 minutes through a dyebath under superatmospheric pressure at temperatures above 212° F and as high as 295° F.

USPat 1,850,551 (1932—Scottish Dyes Ltd): overoxidation of certain vat dyes, e g, Indanthrones is avoided by reoxidizing the dyed fabric at the boil with a dilute acid plus cupric sulfate or chloride.

Am Dyestuff Reptr of Jan 10, 1949, P 9; P 26-32 (Intersectional Contest AATCC—Philadelphia Section): the problem of dyeing wool, cotton, rayon, acetate rayon at high temperatures (above 212°F) has been studied and the results reported.

DYEING APPARATUS——Continuous Dyeing or Otherwise Treating Loose Fibers. C, 6

U S Pat 2,552,078

(General Dyestuff Corp—S H Williams—May 8, 1951)

The preamble of this specification stresses the difficulties experienced heretofore in the dyeing of loose fibers or laps. The main drawback of standard methods is in the formation of color lakes, which filter off and adhere firmly to the material in further spinning or carding procedure. Another disadvantage is manifest in the application of dyestuffs that do not sufficiently exhaust; a great amount of dyestuff, e g, up to 33% of sulfur dyes, remains in the dye liquid and has to be thrown away.

The apparatus protected by this patent is characterized by a pair of endless belts that are, preferably, constructed of stainless steel (F) and (G). (F) runs over rollers (24) and (G), the upper one, runs over (35). Both belts meet at roller (25) and travel from there together through the apparatus over (12, 16, 17) to the delivery rolls (12') and (23)—see Fig 1. (F) and (G) transport the loose material, which is fed either by hopper (A) or in the form of a lapped stock (B). Shortly before the material enters the gap at roller (25), a dyestuff solution (e g, a dispersed vat dye or a naphthol solution) is applied by pipe (39) tranversely over the fiber's surface. Excess liquor runs into box (41) and is applied from underneath by roller (21) in the form of a liquid film to the stock, thereby saturating the material from both sides. Fig 2 demonstrates the further procedure, i e, developing the dye in wells (5). The treating liquid (e g, hydrosulfite-caustic in vat dyeing or diazotized base in naphthol dyeing) is supplied by (46) in this case. It can be seen that the liquid entering the conveyor at regularly spaced openings causes the stock to swell and to expand approximately half way along the vertical path. The material is then squeezed by the conveyors at (16) and this action is repeated in any vertical movement upwards and downwards, thus facilitating penetration. The further aftertreating operations are self-explanatory. Dyeing of loose stock is very much improved and speeded up. This effect is especially spectacular in naphthol dyeing,

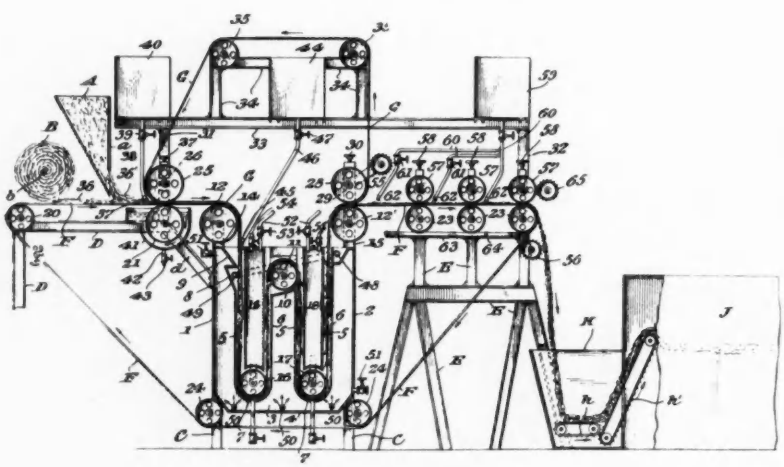


Figure 1—USP 2,552,078

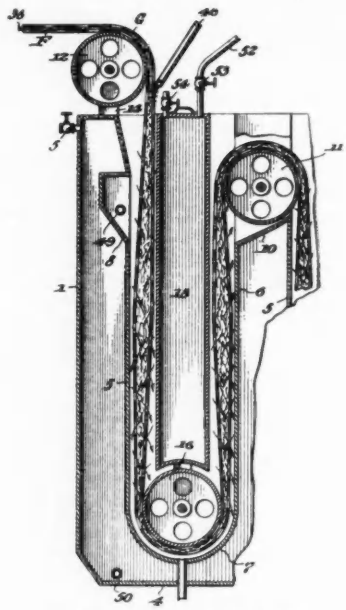


Figure 2—USP 2,552,078

where it is possible to dye the material continuously in a few minutes as compared to the several hours required in standard methods.

The apparatus is intended not only for dyeing but generally for carrying out any two-step process such as waterproofing, flameproofing, mildewproofing, bleaching, etc.

Among other references cited by the Patent Office:

USPat 2,196,695 (1940—Davies): a washing machine for continuous operation moves the goods on conveyor belts under a series of spraying devices for applying cleansing and rinsing fluid alternately and presses the material between by means of rollers.

USPat 1,896,954 (1933—Heap): continuous dyeing achieved by moving fabrics at relatively high speed through a dye liquor, which is projected against and propelled through the material.

USPat 1,071,022 (1913—Meister, Lucius & Bruening): loose textile goods are carried through the dyebath between two conveyors, which alternatively press and expand so that the material is repeatedly saturated with dye liquid.

PRINTING INDIGOSOLS of the Di-anthraquinone Azine Group ——Naphthalene Sulfonates Added. D, 2, 04

U S Pat 2,553,243

(Durand & Huguenin—Duport, Spennrath—May 15, 1951)

This invention relates especially to the reoxidizing process of indigosolized Terra-

hydro -1-2-2′-1′ dianthraquinone azine, corresponding to Indanthrene Blue RS and parallel brands. Difficulties have been experienced in acid reoxidation of this Indigosol dye and former attempts to check overoxidation or to avoid uneven results in developing have failed up to now.

The specification refers to several patents concerning oxidizing processes of the forementioned dyestuff group, e g, USP 2,779,805 (using aromatic amino sulfuric acids as buffers in the oxidizing step), USP 2,224,280 (adding ammonium nitrate to sodium chlorate) and USP 2,234,301 (adding hydroquinone as a protective buffering substance in reoxidizing). All these earlier suggestions apparently did not give satisfactory results.

The problem can be solved, it is stated, by developing the forementioned Indigosol dyes in a steam treatment in the presence of monohydroxy aryl sulfonic- or carboxylic acid or a salt thereof. The prints (or dyeings) are then no longer sensitive to slight changes of the aging conditions. Examples include naphthol sulfonic- or carboxylic acids.

Example: 9 p of the indigosolized Indanthrene Blue RS (22.5% concentrated brand) is mixed with 2 p of 2-naphthol-8-sulfonic acid (pasted with 18 p water and 60 p of a neutral thickener), 8 p of ammoniumthiocyanate 1:1, 2 p of sodiumchlorate solution 1:3 and 1 p of sodium vanadate (1% solution). The fabric is printed with this paste, aged 8 minutes, soaped at the boil and rinsed. This produces a bright blue print. All the examples mention printing formulas, but the process is suitable as well for application in the dyeing of these products.

No references are cited by the Patent Office.

American Cyanamid's USP 2,466,656 (*Am Dyestuff Reptr 38*, 522, 1949) recommends aromatic sulfonates, e g, naphthol sulfonic acid salts, as auxiliaries for reoxidizing Indigosol dyes. This method particularly refers to Indigosols of tetrabromo indigo, which are difficult to oxidize.

SCREEN PRINTING DEVICE——Squeegee Replaced by Rotating Roller D, 4

Brit P 652,449 (Courtney——April 25, 1951)

This specification contends that the use of a squeegee in standard screen printing operations has certain disadvantages. Banking up of the printing ink in front of the squeegee has a tendency to cause formation of pin points of the color, giving uneven prints. Moreover the penetration is frequently insufficient and frothing of the paste occurs, thereby increasing the drying time.

According to the present invention the squeegee is replaced by a layer of felt or another absorbent material and a roller is applied to the surface of the felt, pressing the ink through the screen.

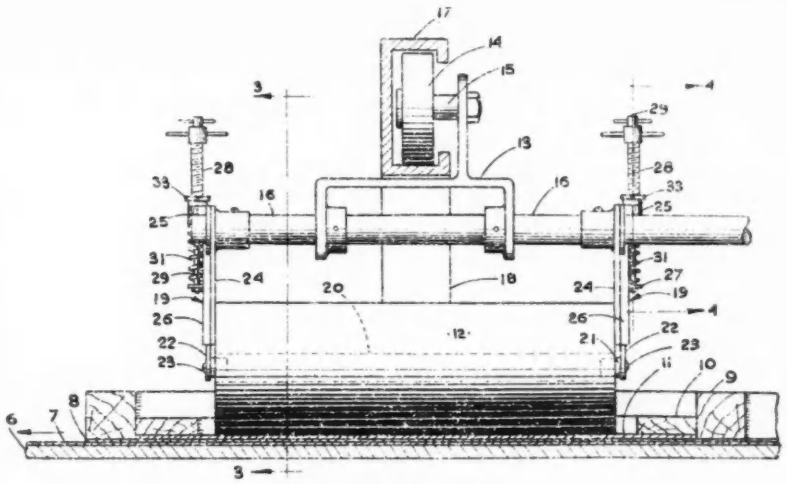


Figure 1—Brit Pat 652,449

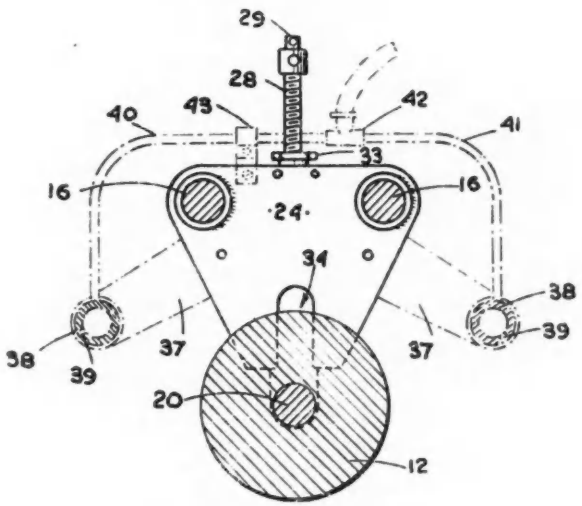


Figure 2—Brit Pat 652,449

Fig 1 illustrates a table (6) upon which the textile material (7) is intermittently moved. The portion to be printed is covered by stencil screen (8), fixed in frame (9); the stencil is covered with the felt (11), which is impregnated with the printing ink. A resiliently-mounted roller (12) moves transversely to the goods to be printed, giving the necessary pressure to squeeze the color through the stencil.

Generally, table (6) can be moved downward after every printing operation, after which fabric (7) is advanced between screen (8) and table (6) and printing is continued. In a modification of this device the stencil frame assembly, ie, screen and frame (8 and 9) and the inking felt (11), can be raised while table (6) remains at the same place. The pressure of roller (12) can be adjusted by locking the hollow screw (25) in any desired position.

A device for applying the printing ink to the felt (11) is shown in Fig 2. Pipes (38) having outlet holes (39) are connected with inlet pipes (40, 41) and T-piece (42) through which the ink flows by means of a suitable pump. Reference is made to Brit P 637,812 (Heintges Jacobs & Co) cf *Am Dyestuff Reptr 39*, 526, 1950, suggesting the application of the ink transversely to the movement of the fabric. Inking by means of color impregnating felts, usual in the block printing technique, has apparently not yet been applied in screen printing methods.

ABSTRACTS

Dyeing of Mixed Fiber Fabrics.

Anon, *Technical Bull* (du Pont) 7, 56-68, June, 1951.

Experimental fabrics composed of new synthetic fibers blended with natural fibers and the older synthetics are being manufactured in increasing variations as the versatility of these materials becomes more apparent.

Four typical suiting shades — blue, green, brown and black—were prepared with direct, acid, Neutracyl and acetate colors on their appropriate fibers. The dyeings were made with five-gram skeins each of viscose rayon, acetate, nylon, Dacron polyester fiber, Type 81 Orlon acrylic fiber, Type 41 Orlon acrylic fiber, and a 50/50 blend of acetate and nylon present in each dye pot.

Another complete set of dyeings was made on a fabric containing viscose rayon, acetate, nylon and Orlon in unknown proportions.

From an examination of these dyeings, the following conclusions were reached:

Dacron polyester fiber is unaffected by direct colors: shows light to medium staining with Neutracyl and acid colors; and is dyed in light to medium shades by acetate colors.

Type 81 Orlon acrylic spun yarn is slightly stained by direct colors and some Neutracyl and acid colors. It is stained considerably by other Neutracyl and acid colors. Acetate dyes either stain Orlon heavily or dye it in light shades.

Type 41 Orlon is lightly stained by Neutracyl and acid colors, is stained considerably by direct colors; and is dyed in medium to heavy shades with acetate colors.—WHC

Insulating Material for Arctic Clothing.

J Press, *Canadian Textile J* 68, 71-2, July 20, 1951 (read at AATT Conference on "New Fabrics for the Armed Forces").

The present conflict in Korea has emphasized the importance of the development of improved Arctic clothing as a means of preserving lives and of enabling the maintenance of maximum, sustained activity during cold weather operations. History has recorded numerous instances in which inadequate clothing has played an important role in the outcome of military campaigns.

A review of Arctic clothing used in World War II showed it to be lacking in several respects. Garment design allowed considerable loss of heat by convection and placed undue strain on the insulation. As a result, heavy, thick clothing was required to maintain warmth. The excessive weight overburdened the wearer. The use of thick insulating materials made the clothing stiff and bulky and restricted body movements.

During the past few years the armed forces have made major strides in the development of improved Arctic clothing. One of the best insulating mediums known to man is still-air. Reduction in convection losses is being accomplished by means of wind-resistant or windproof fabric barriers, covering or enclosing trapped air, and by means of better fitting garments with improved closures. This advanced functional design permits the use of lighter-weight, thinner insulation materials, allowing for the development of looser fitting garments with less strain and pressure on the insulation. Strong, lighter-weight barrier fabrics have helped to reduce weight and stiffness.

An important factor in the design of Arctic clothing is the elimination and/or control of perspiration. This is important not only to maintain the comfort of the wearer but also to maintain a high level of insulation efficiency. The combat soldier operates at high energy and perspiration levels, and because of this the Office of the Quartermaster General has directed its studies to produce clothing which is wind- and rain-resistant but which breathes sufficiently to allow the passage of moisture vapor.

A thorough survey has been made of all types of insulation materials both old and new. In this survey, ground forces have placed major emphasis on reduced weight, improved draping characteristics, and the ability to stand up under severe use. On this basis, the army recently adopted the double-faced mohair frieze for Arctic clothing insulation. The air force, placing principal importance on high thermal efficiency, is currently using a double-faced wool pile fabric.

The navy, operating at generally lower activity levels and subjected to wet operating conditions, has concentrated on the development of clothing which is wind and waterproof and does not "breathe". Batting insulation has been totally enclosed in waterproof fabric barriers. In both cases comfort is maintained by garment design allowing further elimination of moist air by controlled vertical ventilation. The relative merits and limitations of the "breathing" and "nonbreathing" types of insulation barriers are yet to be fully explored.—WHC

The Application to Textiles of Radioactive Isotopes.

E R Trotman, *Textile Recorder* 69, 93-4, July, 1951.

The author first gives an account of the production of radioactive isotopes in an atomic bomb. These isotopes emit β-rays which can be detected with sensitive instruments such as the Geiger counter. Radioactive atoms are often called "tracer" elements, because they leave an unerring trace of their progress through a variety of chemical reactions or physical transportations.

Although not a textile application, the measurement of the rate of circulation of the blood in the body is one of the simplest illustrations of the use of the tracer technique. If a small amount of salt solution containing radioactive sodium is injected into the blood stream, the time taken for it to reach various parts of the body can be measured by placing a Geiger counter over the part in question, and recording the interval between the time of injection and the registration of the β-rays on the instrument.

While it does not appear that radioactive sodium has yet found application in textile technology, analogy at once suggests that it could be used to measure the rate of circulation of liquor in dye vessels, and to ascertain where the penetration of the dye solution into the material is slowest and where most rapid. This should yield valuable information regarding modifications to improve dyeing.

An example of a practical application which has already yielded good results is in the oiling of nylon and rayon yarns. The oil is added to the yarn to make it knit or weave better, and it is obviously important that the distribution should be even. By adding a substance containing a radioactive isotope of bromine to the oil and measuring the β-ray emission along the yarn, beneficial adjustments have been made in the oiling machine.

The distribution of one constituent of a blend in a yarn can also be observed by applying an oil containing a β-ray emitter to the appropriate portion.

Dyestuffs containing a radioactive element should provide the material for a whole series of interesting experiments. The rate of absorption of dyes under various conditions could be observed with the greatest refinement, and the behavior of individual dyes in a mixture could be followed in detail.

The application of radioactive tracers in industrial practice is of course only in

its infancy and the information which has been published in scientific and technical journals is only scanty. There can be no doubt, however, that a great field of exploration lies ahead when the materials are more abundant and there are more trained workers in this field.—WHC

Milling Processes Compared.

T H Sedgwick, *Dyer* 106, 27-9, July 13, 1951.

Milling plays a very important part in the manufacture of certain fabrics. It is the aim of the miller to increase the strength and wearability of the cloth, but there are other objects. In the heavy overcoating trade, for example, milling is required to increase the pile or cover of the cloth so as to enhance its warmth-giving qualities. In worsted finishing, the object of milling is to improve the handle of the cloth, to make it feel soft and "suedy". Milling is also used to modify the appearance of the cloth by closing up the design, and sometimes gives it a slightly covered "wooly" surface.

Each section of the industry employs that method of milling which is most suitable for attaining its particular finish. Today, the principal methods can be placed under the following headings:

(a) Grease milling
(b) Soap milling
(c) Acid milling
(d) Fuller's earth.

GREASE MILLING——As the name indicates, grease milling precedes scouring. Sodium carbonate at 5-8° Tw is usually added to the piece. The alkali combines with the fatty acid present as oil in the cloth and forms a soap. Hence, grease milling is really a dirty form of soap milling which cannot, or should not, be used for light shades or good quality fabrics.

SOAP MILLING——Soap has largely superseded the use of fuller's earth. The usual method is to saponify the pieces first with soda ash or emulsify with soda ash and soap, and give a thorough scour in order to remove the dirt and impurities, followed by milling. In practice, a good milling soap should be easily soluble in water and should contain no free alkali or free fat. One of the best soaps for use in milling of dyed cloths is an oleine soft soap.

ACID MILLING——In this method the acid frequently used is sulfuric acid, which replaces soap for milling purposes, especially in the felt-making industry. Compared with soap milling or grease milling, this method is quicker and gives fabrics of greater strength and elasticity. The X-ray of wool shows that the internal structure is in fact less affected by acid than by alkaline treatment.

FULLER'S EARTH——A finely divided earth, commonly known as fuller's earth, was extensively used before the introduction of soap, both as a detergent and as a fulling agent. It is now rarely employed, but it may be used when a light milling is required for masking faults or for removing superficial color on the fibers after dyeing.

The author describes practical trials in which the three methods of milling (grease, soap, and acid) were compared on the same fabric.—WHC

NEWS

• **Two Highlights of Morningstar, Nicol 100th Anniversary Year**

Customers, suppliers and friends of Joseph Morningstar, president of Morningstar, Nicol, Inc, New York, N Y, present him with a gold cigarette case and lighter, suitably inscribed, commemorating his 35th year as head of the firm founded by his grandfather in 1851. This presentation, by Charles Norman Shaffer, president of the Envelope Manufacturers Association of America, was made during a 100th Anniversary celebration of the Morningstar Company at the Westchester Country Club, Rye, New York on September 6th.

Senator Margaret Chase Smith of Maine, guest of honor at a dinner given this fall by Morningstar, Nicol, Inc of New York and Aroostook Potato Products, Inc, its Maine subsidiary, at Houlton, Me, as part of the Morningstar 100th Anniversary, is shown receiving the first honorary membership ever given by the Maine Institute of Potato Starch Manufacturers. Left to right: James H Page, of Presque Isle, Me, president, Maine Institute of Potato Starch Manufacturers, Inc; Senator Smith; Joseph Morningstar, president, Morningstar, Nicol, Inc.

• $20,000,000 Expansion Loan Announced by GAF

General Aniline & Film Corporation has completed arrangements to secure $20,000,000 from a major insurance company, it is learned.

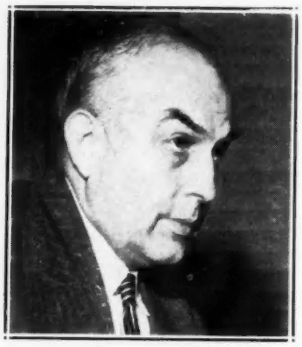
The proceeds of the loan reportedly will be used to carry forward the Company's post-war expansion program, the first phase of which, totaling nearly $30,000,000, is nearing completion. All sections of the Company's operations are said to be included in the expansion plans.

As a necessary step in carrying out the projected plans, Dr Cary R Wagner has been elected senior vice president and John C Franklin has been elected vice president of operations of General Aniline Works, the Company's dyestuffs and chemical division.

Dr Wagner, heretofore vice president in charge of operations, joined General Aniline in 1947. He was for many years Director of Research of the Pure Oil Company and is widely known in the field of petroleum technology. He was a member of the Petroleum Coordinator's staff during World War II and is currently vice president of the Synthetic Organic Chemical Manufacturers Association.

Mr Franklin, present executive vice president of General Dyestuff Corporation and one time President of the American Chemical Society, was formerly Manager of Oak Ridge Operations of the Atomic Energy Commission, a position he left to join General Dyestuff Corporation in 1949.

Research on dyestuffs and chemicals will continue to be conducted at the Company's Central Laboratories at Easton, Pa, it is reported and the Ansco and Ozalid Divisions will carry on the major portion of their research in Binghamton and johnson City, N Y. Certain research services of these Divisions, however, will continue to be carried on in the Easton Laboratories, it is pointed out.



Dr Cary R Wagner

John C Franklin

• Huffines Urges Greater Dye and Finishing Group Participation in FIT

Greater participation by fabric, and dye and finishing firms in the services of the Fashion Institute of Technology was urged by R L Huffines, Jr, president of Burlington Mills Corp, at the opening of the college's fall fabric exhibit on September 26. The display, an annual public service, features fabrics from more than 50 textile firms.

Mr Huffines announced that a membership drive was now underway throughout the cotton, dye and finishing, silk, synthetic, woolen and yarn producing sections of the Industry in order to achieve wider support for the Institute. He made known the following chairmen who have agreed to organize committees for the purpose of augmenting the present membership within their respective segments of the textile industry:

Cottons—Edward Bradley, Pacific Mills

Dye and Finishing — Charles Blount, United Piece Dye Works

Silks—Henry Hafner, Hafner Fabrics Corp

Synthetics—Sam Kramer, Robbins Mills

Wools—Martin Dubman, Miron

Yarn Producers—J C Fortune, American Bemberg

Ceremonies dedicating FIT as a college under the program of the State University of New York will take place on November 14, making it the first public institution at collegiate level devoted to preparation for creative and supervisory responsibilities in the apparel manufacturing and allied industries.

• AAP Establishes Paterson Service Branch

American Aniline Products, Inc has set up a full scale branch in the Paterson, N J area with Robert W Brewer as branch manager. Operations have already begun at the new site, which was selected from among several under consideration.

The company intends to carry normal dyestuff stocks for delivery in the immediate Paterson area but the prime feature of the new quarters will be the establishment and operation of a fully equipped dyestuff application laboratory.

Mr Brewer, long a resident of the area, has had 25 years in the industry. He was formerly connected in a sales capacity with the Calco Chemical Division, and later was engaged in his own business, the Line Chemical Co.

The AAP sales force will include Louis J Dogin, Gerard Heine and Richard E Milana.

The address of the branch is 116 Washington Ave, Hawthorne, N J.

Dr Harold C Urey, Nobel Award scientist and discoverer of heavy hydrogen, is shown viewing the documents and analyses proving James Watt the man who first stated the composition of water. Dr Urey officially opened the Water Controversy exhibit held recently at the New York Public Library. The documents were lent by the Dexter Chemical Corporation.

• Price Reductions for Capryl Alcohol, Igepals and Styrene-Butadiene Latices

Price reductions in three widely-used chemical groups were announced over the past month as follows:

Reductions up to 5c a pound for the Igepal nonionic surfactants were announced by Harold G Shelton, salesmanager of the Antara Products Division of General Dyestuff Corporation, due to "recent streamlining in manufacturing facilities".

Further reductions in capryl alcohol prices have been announced by Rohm & Haas Company, with the new price set at 17½c/lb in tank-car quantities, f o b Philadelphia, for the technical grade containing approximately 85% capryl alcohol and 15% methyl hexyl ketone. At the same time a new grade of capryl alcohol, containing approximately 95% capryl alcohol and 5% methyl hexyl ketone was announced. It is priced at 20¼c/lb, f o b Philadelphia.

American Polymer Corp, Peabody, Mass is reducing prices on styrene-butadiene latices, such as polybutadiene latex Polyco 418, which now sells for approximately 30c a dry pound. The APC products are fully available and described in data sheet P 24.

• Industrial Consultants Move to Larchmont

In an expansion move, the Werner Textile Consultants and P O M Co, industrial consultants, have moved their Planning & Research Department to 1889 Palmer Avenue, Larchmont, N Y. The move affects the organization's top executives, their staff, the Drafting and Designing Department and the Research Library. New York City headquarters will remain in the Lincoln Building, 60 E 42nd St, opposite Grand Central Station, as over the past 10 years.

The new offices are said to occupy 2500 sq feet of space in the building located at the Larchmont railroad station. Mailing address: P O Box 208, Larchmont.

• Cyanamid Establishes ITT Fellowship

American Cyanamid Company has established a two-year graduate fellowship at the Institute of Textile Technology, Charlottesville, Virginia, amounting to $5,000, for a course of studies in textile chemistry leading to an M S in Textile Technology.

Richard P Barber, a graduate of Bradford Durfee Technical Institute, has been selected by the Institute to study under the fellowship and will pursue the degree until June, 1953. During the 1952 summer vacation, he will work at one of the member textile mills associated with the Institute.

• Mathieson Acquires Heyden Interest in American Potash

It is learned that Heyden Chemical Corporation has sent a letter to its stockholders advising that Mathieson Chemical Corporation has purchased all of the 134,725 shares of American Potash and Chemical Corporation owned by Heyden at a price of $5,389,000 or $40 per share resulting in a capital gain to Heyden of approximately $840,000. The option to purchase Heyden's 25 percent holdings in American Potash reportedly was exercised on October 9, 1951 with A G Becker & Company, Inc, acting as agent.

Heyden's 25 percent interest in American Potash and Chemical Corporation was acquired between 1946 and 1950 at an average price of $33.77 per share, it is reported. The shares of American Potash are said to have been carried on Heyden's books at the cost of $4,549,933 including certain expenses in connection with the acquisition of such shares.

The sale is in line with Heyden's announced policy of achieving closer integration of production facilities in fields where they are already established.

• Otto B May Appoints Carbic As Sales Representatives

The appointment of Carbic Color & Chemical Company, Inc, as sales representatives for Mayvat dyestuffs has been announced by Otto B May, Inc, 198 Niagara Street, Newark, N J.

Carbic will represent the May organization in New England, the Middle Atlantic States and Canada, it is learned. Dyer S Moss Co, Charlotte, N C will continue to represent both Carbic and May organizations in the southern area.

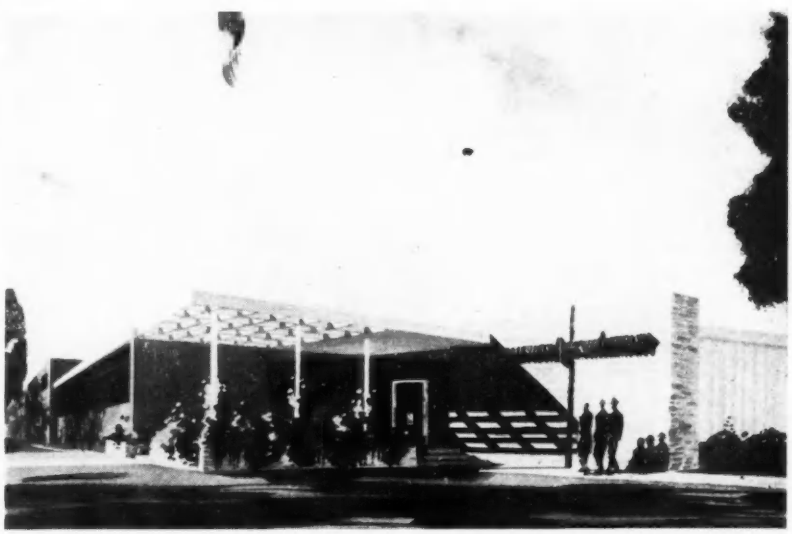
• ACC Completes Los Angeles Consolidation

Open house ceremonies on September 27th marked the formal opening of the newly-constructed building to be occupied by American Cyanamid Company at 2300 S Eastern Avenue, Los Angeles, Cal.

The move, which consolidates the several Company office and warehouse locations in Los Angeles, is the fourth of its kind undertaken by ACC as part of a program calling for similar consolidations in major cities in the U S and Canada.

The building is a 64,000 square-foot, one-story structure containing 44,000 square feet of warehouse space and 20,000 square feet of offices. It occupies a seven-acre site in the Central Manufacturing District sufficiently large to allow for possible future expansion and is held by Cyanamid under a long term lease reportedly calling for a total rental of about $1,000,000. Office, laboratory and certain storage areas are air-conditioned and special refrigeration equipment is also provided.

Among Cyanamid executives whose offices will be in the new building are: Sheldon Dahl, West Coast manager in charge of sales and manufacturing of the Industrial Chemicals and Plastics and Plastics and Resins Divisions; Edward Larson, Regional Manager of Lederle Laboratories Division; and the following West Coast department heads of Calco Chemical Division: H L Oak, pigment; and W D Walker, Pharmaceuticals.



Drawing of American Cyanamid Company's New Location in Los Angeles

• Warwick to Distribute Water-Repellency Tags from New York

In order ot facilitate the distribution of Warwick Chemical's "Norane" and "Impregnole" water repellent garment tags, all phases of their distribution have been centralized in the New York office of Warwick Chemical Company, Division of Sun Chemical Corporation, Long Island City, N Y. In accordance with a laboratory certified plan, these tags and labels are supplied by Warwick to manufacturers of water repellent garments. The registration number on each tag is designed to assure the consumer that the fabric has been tested and approved in Warwick's laboratories for water repellency and high consistency of proper application and to uncover any deviation from standard and assure shipment of registered tags certifying positive water repellent performance.

• LTI Opens Alumni Memorial Library

The Lowell Textile Institute Alumni Memorial Library was opened on Monday morning, September 24, with informal ceremonies. Later in the year, following a formal dedication, the building and equipment, valued at approximately a third of a million dollars, will be deeded as a gift to the Commonwealth of Massachusetts.

Planned as a tribute to the Alumni of the Institute who served in both world wars, and as an expression of faith in the future of New England in the textile manufacturing and education fields, the Library was financed by alumni, industrial firms, and textile foundations. It has reading and study facilities for 150 students, as well as offices, lounges, a dark room and microfilm facilities.

• Pyne Wins DCAT Golf Trophy

Percy R Pyne, (Calco Chemical Div, American Cyanamid Company) won the DCAT Golf Tournament held Saturday, Sept 22, during the 61st Annual Meeting of the Drug, Chemical and Allied Trades Section of the New York Board of Trade at Shawnee-on-Delaware, Pa. He was awarded the DCAT Golf Trophy at the banquet Saturday evening by Wm W Huisking, Chairman of the Golf Committee.

An increasingly popular feature of the DCAT Annual Meeting is the miscellaneous sports competition. This committee, headed by J David Hayden, assisted by Fred G Singer, awarded prizes to the winners in croquet, shuffleboard, putting, horseshoes and archery.

• Compton Cites ITT Research

More than 300 short-term research projects on individual textile mill technical problems have been completed within the last 23 months for member mills at the Institute of Textile Technology in Charlottesville, Virginia, according to Dr Jack Compton, Institute Technical Director, in in address to new Research Fellows at preschool Orientation exercises.

Included among the typical technical problems cited by Dr Compton as having been solved for members were difficulties in mercerizing and dyeing irrigated cotton; dye affinity of blended yarns; uniformity testing, and testing duck for mildew susceptibility.

Dr L H Lance, Chairman of the Committee on Academic Studies, introduced Dr Compton. Other speakers who described various activities of the Institute to the new students were Dr J L Vaughan, president; C M Bowden, editor of the *Textile Technology Digest;* Dr E J Bernet, head of the Institute's Physics Division; J E Dougherty, head of the Textile Engineering Section; Dr W H Martin, research associate in chemistry; Professor E J Oglesby of the University of Virginia faculty and lecturer in mathematics at the Institute; and Professor E C McClintock, Jr, of the University of Virginia and lecturer in English at the Institute.

NAMES IN THE NEWS

• Nuodex Appoints New Executive V-P

ARTHUR MINICH, formerly vice president in charge of research and development, has been appointed executive vice president of Nuodex Products Co, Inc, Elizabeth, N J, according to an announcement by Leo Roon, president of the company.

Mr Nidich joined the company as its first chemist in 1932, the year it was founded. Prior to becoming vice president in charge of research and development in 1943, he was chief chemist, Elizabeth plant manager, technical director, and secretary of the firm.

• Fifty Years in the Dyestuff Industry

REGINALD P MANNERS, treasurer, National Aniline Division, Allied Chemical & Dye Corporation, New York, completed fifty years of continuous service in the dyestuffs industry on October 1st, 1951. Mr Manners came to National Aniline from Century Color Corporation in the merger of chemical companies during 1917.

Reginald P Manners

• British-American Carbon Appointments

W J Crawford, president, British-American Carbon Corporation, New York, U S Manufacturers of "Delanium" carbon, has announced the appointments of DANIEL W KALLMAN and JOHN T O'ROURKE as sales engineers of the Eastern division for Delanium carbon cubic heat exchangers.

Before joining British American, Mr Kallman was general manager of the Parlam Corporation, sales agents for Powell Duffryn Carbon Products, Ltd in this country, until Powell Duffryn joined with Great Lakes Carbon Corporation, N Y, in forming British-American Carbon Corporation. Powell Duffryn developed Delanium, which is a form of patented carbon.

Mr O'Rourke was formerly employed by the Alco Products Division of American Locomotive Company as Sales Engineer.

• Hiller New IMCC District Manager

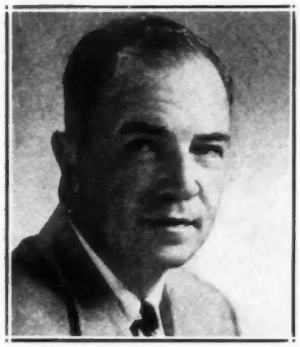
PAUL W HILLER has been appointed New York district manager of chemical sales for the Potash Division of International Minerals & Chemical Corporation. His offices will be at 61 Broadway, New York, N Y.

Mr Hiller has been manager of the products development department of Innis, Speiden & Co, a subsidiary of International, since 1948. His work in that department was conducted along with sales activities in the chemical and allied industries. He joined the sales department of Innis, Speiden in 1919.

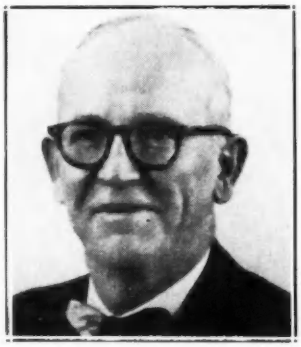
Neal M Draper

Verne W Aubel, Jr

A Benjamin Kennedy



Harry R Stoothoff



Elmer J Seener

Arthur Phillipps, Jr

• Solvay Appoints New Managers

The appointment of new sales and branch managers for several departments and district offices has been announced by the Solvay Sales Division, Allied Chemical & Dye Corporation. All are currently effective.

NEAL M DRAPER, formerly manager of Solvay's St Louis branch, moves to the New York executive offices as Manager of the Ammonium and Potassium Products Department. HARRY R STOOTHOFF, who has been Assistant Manager of the Chicago branch office, becomes manager of the Special Alkalies & Cleansers Department. VERNE W AUBEL, JR is advanced from supervisor to Manager of the Calcium Chloride Department.

E J SEENER succeeds Mr Draper as branch manager at St Louis, where he has been assistant manager for the past four years. A BENJAMIN KENNEDY is the new branch manager of Solvay's Detroit office, succeeding ARTHUR PHILLIPPS, JR who will fill the newly created post of assistant to Solvay's director of sales.

• Macbeth Elects New Director

CARL E FOSS, color consultant, was elected a director of the Macbeth Corporation, Newburgh, N Y, manufacturers of scientific apparatus and color control equipment, at a stockholders' meeting recently.

Mr Foss, who is presently color consultant to the Sherwin-Williams Company and their allied companies, as well as to the Wyandotte Chemical Company and the Container Corporation of America, is also president of the Munsell Color Company of Baltimore, Md.

During the war, Mr Foss was actively connected with the Office of Scientific Research and Development working with the problems of vision and color. Prior to that time he was assistant director of research for the Interchemical Corporation.

• Polacek Joins Wyandotte Research Staff

ROBERT J POLACEK has joined the Research and Development Division of Wyandotte Chemicals Corporation as a field service representative in the market development department. He will be concerned with the introduction and servicing of new products resulting from Wyandotte's expanding organic chemicals program.

• Two Prominent Europeans Visiting U S

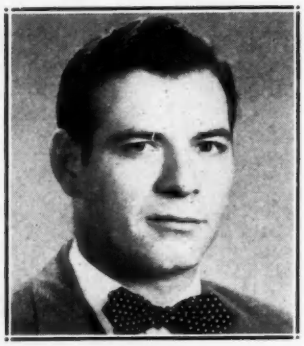
DR BAILLI NILSSEN, head of the Norwegian Institute of Textile Research, arrived in the United States earlier this month. He is chairman of the Norwegian Committee for Standardizing Testing Methods and is here primarily to study American methods.

G S J WHITE, chief colorist for the Dyestuff Division, Imperial Chemical Industries, arrived in New York on October 16th to attend the AATCC convention, where he spoke at the Annual Banquet. Mr White has traveled extensively in the interests of his company, and has taken a leading part in England in the activities of the Manchester Section of the Society of Dyers & Colourists.

• Brunt Joins Southern Latex

After a twenty years association with the Flintkote Company, 30 Rockefeller Plaza, New York City, GEORGE N BRUNT has joined Southern Latex Corporation, Austell, Georgia, as general manager.

Mr Brunt is a member of the New York Rubber Group of the American Chemical Society.



Nat Kessler

• Kessler Assumes New Staley Post

Appointment of NAT KESSLER to the newly-created position of technical supervisor at the Painesville, O, soybean processing plant of the A E Staley Manufacturing Company has been announced by Paul R Ray, manager of Staley's soybean division.

Mr Kessler has been a chemical engineer with the Staley company at Decatur, since 1944.

The Painesville plant, which has been operated by the Staley company since 1939, is currently being converted from the older expeller type operation to the modern solvent extraction process. Mr Kessler had charge of the chemical engineering on a solvent extraction plant built by the Staley company in Decatur last year and participated in the preliminary engineering work in the Painesville modernization.

• ATP Appointment

BEN GRANBY, formerly of Granby Fabrics, has been appointed Director of Research and Promotion for Allied Textile Printers, Inc.

• West, Farlow, Glespen Appointed to New ACC Posts

H J WEST has been named technical director of American Cyanamid Company's Bridgeville, Pa plant where he will direct development, pilot plant operations, raw material and finished product specifications, and the control laboratory. He will also act as coordinator between the Bridgeville plant and the company's consolidated research laboratories in Stamford, Conn.

V R FARLOW and G L GLESPEN have been named to ACC's Petroleum Chemicals Department, Mr Farlow as sales supervisor and Mr Glespen as technical supervisor. Since 1945, Mr Farlow had been technical representative on petroleum chemicals in the Company's Chicago office, and Mr Glespen had been supervisor of catalyst products at the Company's headquarters in New York.

• New FIT Public Relations Chairman

IRENE BLUNT, Executive Secretary of the National Federation of Textiles, has accepted appointment as Public Relations Chairman for the Textile Advisory Committee of the Fashion Institute of Technology; she will prepare the descriptive material concerning the Committee's activities.

○ Bowman Appointed to Avisco Research Post

WILLIAM W BOWMAN, superintendent of the research plant of the textile research department of American Viscose Corporation, has been appointed assistant to HARRY E NEW, head of the department's cotton division. Mr Bowman was connected with Continental Mills, Inc of Germantown, Pa, before joining Avisco in 1940.

Malvern J Hiler

• Hiler Heads Commonwealth Engineering

MALVERN J HILER has been appointed president of The Commonwealth Engineering Company of Ohio, according to an announcement by the Board of Directors of that company. He has served for the last three years as executive vice-president. Mr. Hiler has been successively a research chemist with Sharples Solvents Co, district sales manager of the Sharples Chemicals, Inc, and later director of research and development, Stepan Chemical Co, Chicago, Illinois.

• Ruling, Fitzgibbon New G-E Managers

F CHARLES RULING has been named manager of the Atlantic Division of General Electric Company's Apparatus Sales Division, with responsibility for sale of G-E apparatus products in the states of Virginia, West Va, Md and Del; most of Pa, and portions of N J, N C and Ohio. His headquarters will be in Philadelphia.

JAMES J FITZGIBBON succeeds Mr Ruling as manager of the G-E Apparatus sales office in Washington, D C.

TECHNICAL LITERATURE

Hydrogen Peroxide in the Manufacture of Viscose

Bulletin No 30
Becco Sales Corporation
Station B
Buffalo 7, N Y
Available on request.

This bulletin, by the Buffalo Electro-Chemical Company, describes the technique of making viscose rayon and explains the role of hydrogen peroxide in aging alkali cellulose and the ripening of viscose. Hydrogen peroxide is used to shorten the aging period of alkali cellulose to obtain suitable viscosity for spinning solutions and to reduce the ripening time of cellulose xanthate spinning solutions, simultaneously improving their filterability with a minimum of process control and substantial reduction of overall processing time.

Special Textile Finishes for Service, Protection and Appearance (5th Edition)

United States Testing Co, Inc
1415 Park Avenue
Hoboken, N J
Available on request (Write to Dorothy McDonald, Consumer Service Division).

For several years the United States Testing Company has offered this directory, but the new Fifth Edition has been enlarged to a 10-page listing of trade names and their manufacturers. As in previous editions, information is given on the fibers to which each finish may be applied, as well as the properties of the various finishes. Originally, this listing was made available to subscribers of the *Testing League Bulletin,* the monthly United States Testing Company textile publication.

This directory has been compiled through the cooperation of textile manufacturers and finishers and it is based upon information provided by the manufacturer. It does not indicate an endorsement by the United States Testing Company, Inc.

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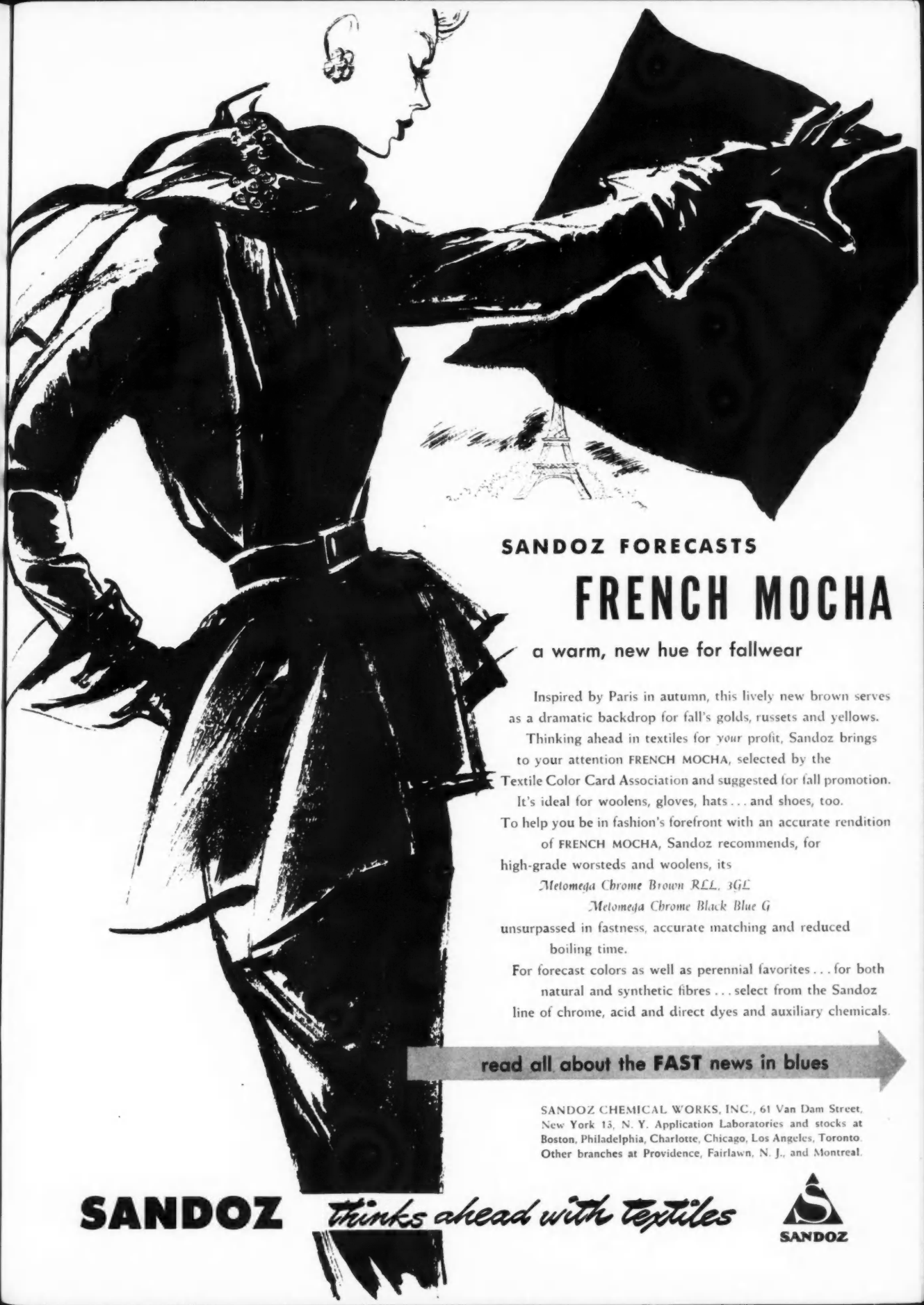

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a warm, new hue for fallwear

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Thinking ahead in textiles for *your* profit, Sandoz brings to your attention FRENCH MOCHA, selected by the Textile Color Card Association and suggested for fall promotion. It's ideal for woolens, gloves, hats . . . and shoes, too.

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		COTTON	VISCOSE
Fastness to Light		6 6–7 7	6–7 7 7
Fastness to Water:	change in shade	5	5
	staining	5	5
Fastness to Washing at 140 F: (medium shades)	change in shade	4–5	4–5
	staining	4	4–5
Fastness to Alkalies		4	4
Fastness to Sulphite		5	5
Fastness to Acids:	Acetic Acid 30%	5	4
	Hydrochloric Acid 10%	2	2
Fastness to Scrooping		4	4
Fastness to Rubbing		5	5
Fastness to Perspiration:	change in shade	4–5	4–5
	staining of wool	5	5
	staining of cotton	5	5
Fastness to Heat		5	4–5
Fastness to Hot Wet Pressing		5	5
Fastness to Formaldehyde		4	4
Dischargeability by special recipe		4	4
Sensitive to Metals:	copper	4	4
	iron	4	4
Sensitive to Lime		not sensitive	
Change of shade in artificial light		greener	greener
Reserve of Acetate Rayon (Type ACS)		white	white
Reserve of Nylon		white	white
Suitability for rubberized goods		not suitable	
Suitability for anti-crease treatment		suitable	
Temperature of maximum exhaustion		175–195 F (80–90 C)	

5 (8 for light-fastness) denotes the best,
1 denotes the least degree of fastness.

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THE SIXTEENTH ANNUAL PROCESSING REVIEW NUMBER will appear on DECEMBER 10th, 1951

One of the special features of past issues, which will be continued this year, is a listing of new products for the textile wet processing field.

You are invited to submit information concerning such products which you have brought out since November, 1950.

This information should include: the trade name of the product and a BRIEF summary of its uses. Please list each product on a separate sheet of paper. If illustrations are necessary, glossy photographs or black ink drawings should be furnished. If the trade name is registered or the product is patented and you wish this indicated, please so note.

In order to insure your products being listed in our issue of December 10th, information concerning them should be in our hands NO LATER THAN NOVEMBER 12TH.

It is important that you list ONLY those products which have been brought out since November, 1950.

The response from manufacturers in the past fifteen years has provided the basis for a most valuable and useful listing and we trust that you will again cooperate to the fullest extent.

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WANTED: Southern district salesman. Graduate of a recognized textile college preferred. Excellent opportunity for the right man. Please state age, experience, draft status, and salary expected. Write P.O. Box 208. Dublin, Georgia.

WANTED—dyer experienced on synthetic—filament and spun—fabrics and blends. Excellent opportunity—employment in south with large, well-established company. All applications must include full details of work experience, background and salary expected. Write Box No. 212.

POSITION WANTED: Technical Sales. Large following, wide experience on all types dyeing equipment, backed with wet and dry finishing experience. Business training, consulting and executive background. Married. Write Box No. 186.

POSITION WANTED: Technically trained dyestuff man with many years of experience in selling and other essentials, requires a position as salesman for well established dyestuff firm or purchasing agent for a mill. Write Box No. 193.

POSITION WANTED: Experienced package and hosiery dyer on cotton, mercerized rayon, nylon, wool with vats, naphthols, develops, acid, directs and aftertreated dyestuffs. Twenty years as foreman on dyeing, winding, etc. Handle help successfully. Production and cost-minded. High school and ICS chemistry education. Am married, now employed. Prefer southern location. Am sober. Write Box No. 215.

POSITION WANTED: dyeing tricot fabrics. Good background of tricot dyeing, finishing and testing experience. Write Box No. 216.

WANTED: Dyer - Acetate - Nylon - rayon piece goods on Jiggs or Boxes. State experience, salary desired, technical background. Third shift. Paterson, New Jersey, Post Office Box 1742.

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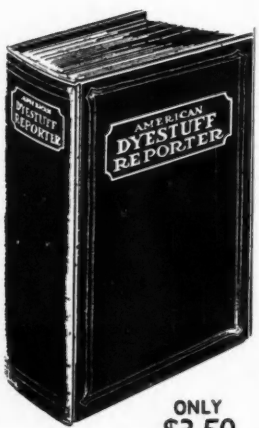

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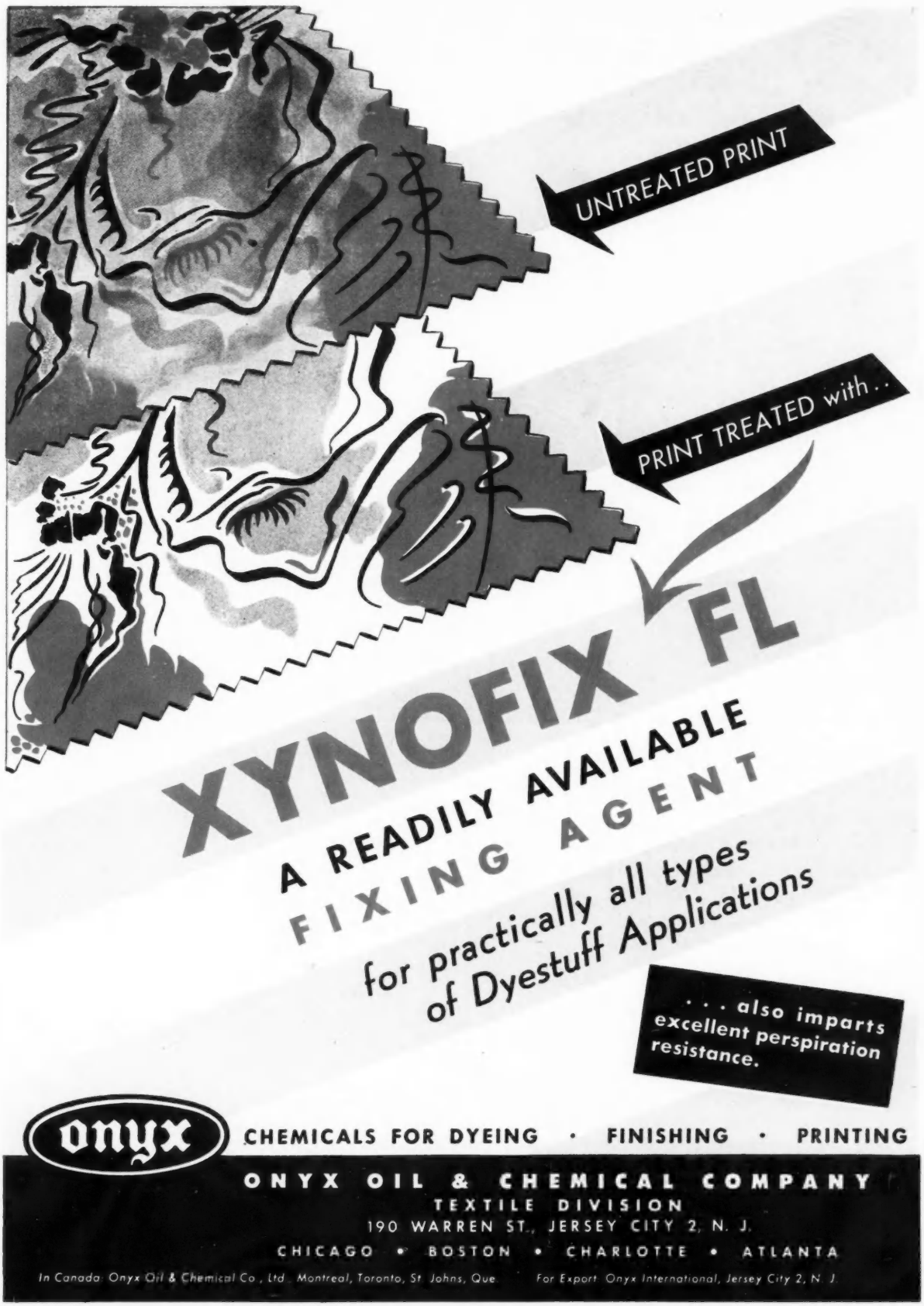
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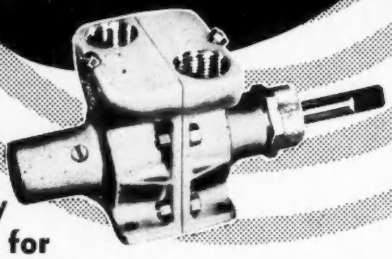

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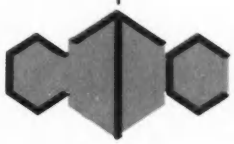

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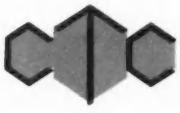
tex-chem co. 

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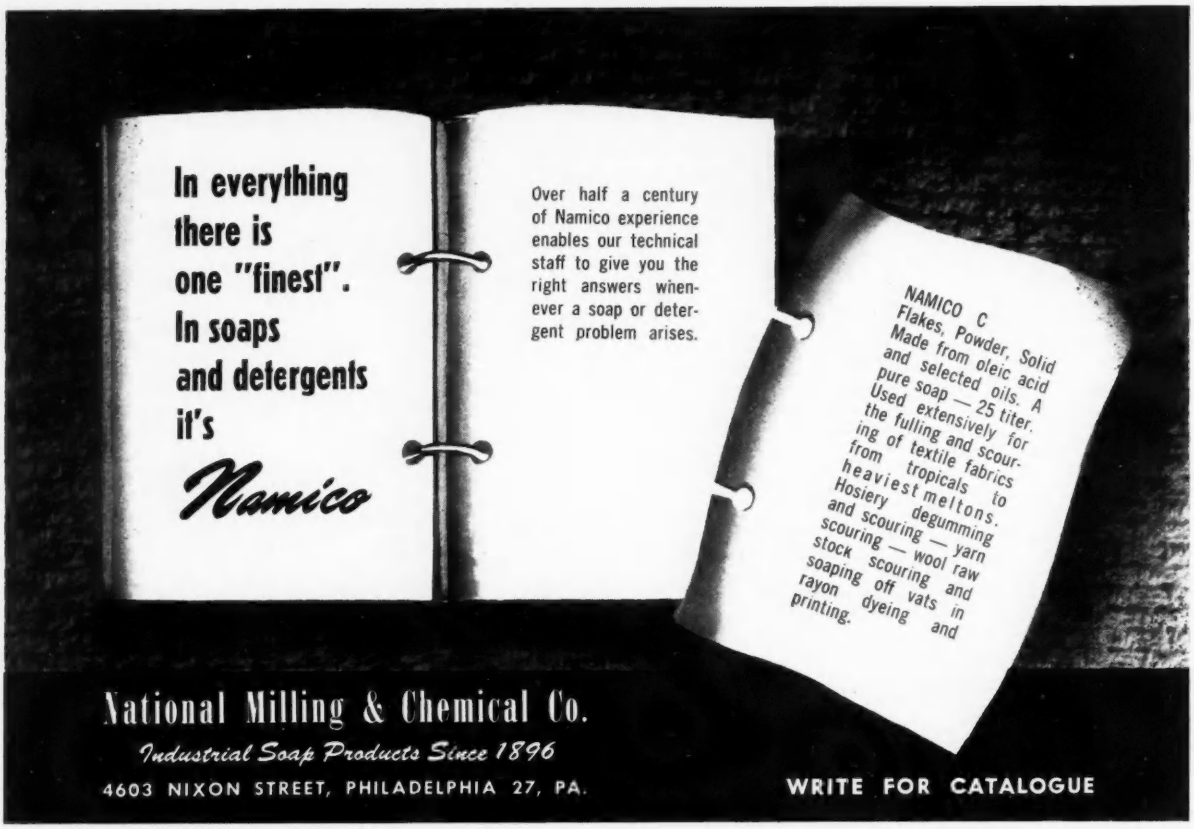
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